Telephony.

THE AMERICAN TELEPHONE JOURNAL

Comprising Telephony, American Telephone Journal, Telephone Weekly, Telephone Magazine, Telephone Securities, The Telephone, Sound Waves
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CHICAGO, SATURDAY, SEPTEMBER 19, 1914

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WHAT KNOWLEDGE DOES.

Knowledge is that which, next to virtue, truly and essentially raises one man above another—Addison.

Fair Words Are Not Enough.

In an article entitled "Wrong Ideas About the Bell System," which appeared in a recent issue of Public Service, N. C. Kingsbury advances some interesting theories regarding the American Telephone & Telegraph Co., of which he is vice-president and one of the most influential executive heads. Since the days of bitter warfare between the Bell and Independent telephone forces, there has been more or less negotiation between the two interests; and Vice-President Kingsbury, in many cases, has been the spokesman of the big corporation. It is only fair to state, too, that he has done much to establish the idea that the Bell was not all horns and tail and pitchfork. In fact, it was almost impossible to harbor the notion that so urbane a gentleman as Mr. Kingsbury could be connected with a corporation possessing those ear-marks of a devilish octopus.

In the article referred to, Mr. Kingsbury argues that the Bell system is not a monopoly and does not want to eliminate competition in the telephone industry. Independents will agree with him on the first proposition. They know their own strength too well to concede that the Bell has a monopoly. As to the other statement—that the Bell does not desire to kill competition—they are not so sure. In fact, history would tend to prove the very opposite; otherwise, why the hard persistent fight on the part of the Bell to destroy Independent competition?

We all know, of course, that of late years it has been the part of wisdom for big corporations to deny the accusation that they are monopolies. Twenty years ago, they courted this distinction and gloried in the claim that they were the whole thing in their particular fields. But this has not been a popular or profitable role to play since the federal government began its crusade against the trusts. In fact, as Mr. Kingsbury candidly says: "It is a dangerous thing to be a monopoly at the present time. It is a dangerous thing to claim to be a monopoly, even if you are not, and it is even a dangerous thing to pass the accusation by without an emphatic denial. It is well to know just the facts in regard to competitive conditions in this country. Now we are not a monopoly, and, furthermore, we do not want a monopoly. The responsibility of financing the entire telephone needs of this country is in itself enough to cause the bravest man, or set of men, to shrink."

Right there he laid his finger on the vital point of the whole matter. No doubt this phase of the telephone situation has had more to do with influencing men on both sides to urge the cessation of destructive warfare than any other factor. The financial needs of both Bell and Independents are so great that wise men have declared there should be an end to wasteful competition so that both sides can devote that mis-spent energy and money to constructive development of their opportunities.

Reading between the lines, it is easy to see that the Bell executive wishes it understood that there is room for both sides and that a policy of "live and let live" will enable Bell and Independents to build up their business and make money in their respective territories. Mr. Kingsbury, in the same article, touches on the purchase of Independent telephone plants by the Bell, and alleges that these mergers have been at the solicitation of its competitors. To quote him:

"The question of merger, of purchase, or sale, has been a prominent question with us for the last few years, because in a great many instances the owners of the different telephone companies have wished to sell; and I believe in no instance have we gone of our own volition to an Independent company for the purpose of urging it to merge its property with ours, or to sell its property to us; and I believe this is a fact that we have withdrawn from a larger extent of territory in the past five years than we have entered."

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A telephone is only a path of last resort. The Cox Multiple Arrester makes the path of low resistance and distributes the discharge at many points.

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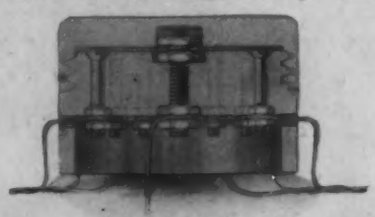

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Highly efficient. Would you like samples?

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You Can Rest Assured That There is None Better

The No. 1 L local battery transmitter has absolutely the lowest battery consumption for a given volume of transmission.

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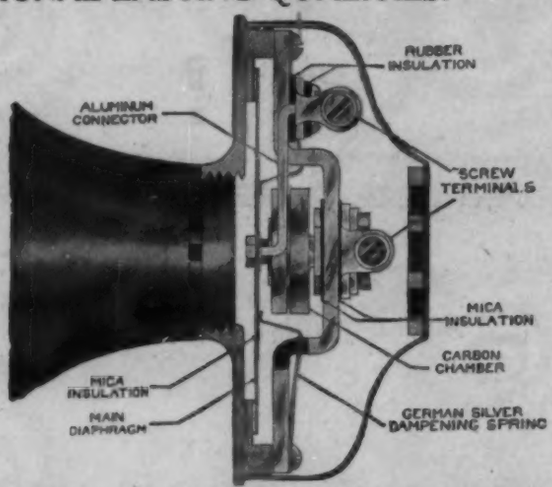

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J-M Fibre Conduit

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"Unskilled labor lays it rapidly.'

"You, like hundreds of other companies that use J-M Fibre Conduit, will find it infinitely better and far cheaper."

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May be briefly defined as giving our customers—small and large—good service—good materials—good work—and good cords.

But our conception of service is set high. We want Runzel-Lenz customers to use our cords always—not simply because they are good cords, but because they are "Runzel-Lenz" Cords—*the guarantee of quality and permanent satisfaction.*

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"Quality First"

Quality is the keynote in the manufacture of the No. 896 Compact Type Wall telephone. This instrument is a genuine aristocrat in the telephone world.

With sixteen years experience in telephone designing we have produced in this type a telephone that is neat in design—durable in construction and absolutely reliable. To realize the truth of this statement you should order one and make a comparison. Pamphlet No. 42 describing this instrument is yours for the asking

Stromberg-Carlson Telephone Mfg. Co.
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Chicago Ill. Toronto, Can.

Please tell the Advertiser you saw his Announcement in TELEPHONY.

The Company Back of This Telephone is Your Best Guarantee of Its Dependability

This popular No. 988 type Portable Desk Telephone is the standard of all the various equipments we offer for common battery service.

The construction of the instrument is attractive, simple and durable. Hookswitch spring assembly, terminal block and induction coil are accessibly mounted in the base on a plate, which is readily removable for inspection.

To appreciate the real worth of this instrument you should get one—take it apart—look it over carefully—then put it back together again; it will only take a few minutes—then give it a test over long or short distance lines. You'll want no other. May we send a sample?

Code No. 988

Stromberg-Carlson Telephone Mfg. Co.

Rochester, New York

Chicago, Ill. Toronto, Can.

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Something to Brag About

Gentlemen:

I am glad to say I can praise your telephones. We received them September second and put them in use September third, and they surely are giving good service. They are certainly good boxes and reached us in perfect condition.

Everybody on this line brags of your phones.

Will send your money right away, and will say there are more wanting me to order additional telephones.

If you will send me one of your catalogues, I hope to send in another order soon.

A Word About Transmission

Dear Sir:

I beg to advise that I was having, prior to the time of the installation of your instrument, a great deal of trouble in getting transmission over our long distance lines and that since this instrument has been installed I am very much pleased to be able to state that the transmission on long distance over it is even better than the trasmission over our local telephone for city calls.

I have never seen an equal of this telephone for long distance service.

Best on the Market

Gentlemen:

I received the two orders of you and the phones are giving entire satisfaction. I believe they are the best on the market. Please fill this order at your earliest convenience.

Giving the People What They Want

Gentlemen:

Will you please ship me eight phones like the ones you have been shipping me. I thought I would order from another Company, as I could get them cheaper, but the people are begging for the Kellogg.

How Our Bulletins Are Received

Gentlemen:

I received your bulletins O. K.

They are the best I ever saw,- I can gain more technical knowledge from studying your bulletins, than I can from a book I paid $3.00 for.

Automatic Ringing

Gentlemen:

So far the equipment is very satisfactory, especially the automatic ringing which we consider one of the most important improvements in the telephone field in years.

When all of our construction work is done and we are running normally, we expect to use just half the number of operators which we had with our old equipment.

Kellogg Service in Arkansas

Gentlemen:

I wish to say that every telephone you have shipped to me has proven perfectly satisfactory and I do not believe that any company equals Kellogg for service.

More Than Satisfactory

Gentlemen:

So far all goods received from your Company have been more than satisfactory, and when in need of any of your apparatus you may be assured we will call on you.

Like To Do Business with Us

Gentlemen:

Your phones are giving most excellent satisfaction, and we have found you very fine people to do business with. It affords us pleasure to recommend you and your goods to the trade.

USE IS THE TEST

Kellogg Switchboard and Supply Company

Complete line carried in stock

Pacific Coast Office and Warehouse,

86 Third Street, San Francisco, Calif.

Main Office and Factory, Chicago Kansas City Office, 407 Broadway

Canadian Branch: Canada West Elec. Ltd., Regina, Sask.

SWITCH

The 3-position Magneto board installed by us in 1909 is giving excellent service. We are well satisfied with your equipment.

About five years ago we bought from your company a unit type common battery switchboard and we are pleased to advise that it's easily good for another five years of good service---the maintenance is practically nil.

Our experience with your switchboards has been of a most pleasing character.

We have in operation nine of your switchboards including P. B. X. equipment, and in each case the results obtained are very satisfactory.

The above extracts from letters are but a few samples of expressions daily received from satisfied users everywhere.

The Garford Manufac

Branch,

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BOARDS

Making Switchboards

is our business and we make them pay you in good service, long life, quick, easy and economical operation, and the purchasers of such equipment upon investigation have found features in our product particularly pleasing.

It is our wish to co-operate with you in the selection of equipment that will give you the best results. Tell us your conditions and allow us to submit our recommendations---and reasons why, such recommendations may mean information that you want and will appreciate, that will be of real value to you. At least you in no way obligate yourself by writing us, and you will find it decidely worth while to do so.

turing Co., Elyria, Ohio

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TELEPHONE SYSTEMS-PROTECTIVE APPARATUS AND SUPPLIES

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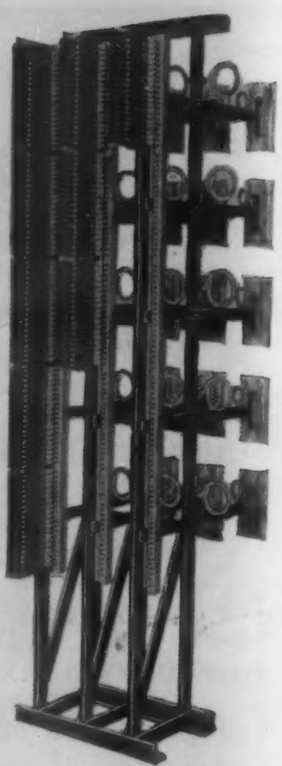
Better apparatus at lower cost. You will grow, so install a frame that permits of expansion without scrapping your present apparatus, This is made possible by installing Cook's Type L Main Distributing Frame. Built in sections of 100 to 200 pairs.



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Frank B Cook Co.

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ELIMINATES OPERATORS:—

There are no salaries to pay, no training expenses to meet. Supervision costs you nothing, and welfare work and vacations are done away with. You do not have to take precautions, frequently very costly, against strikes.

REDUCES RENT (or cost of building):—

Since Automatic Equipment takes up much less space than manual, you can rent or build smaller quarters. Furthermore, you do not have to provide elaborate rest rooms and other facilities required by operators.

SAVES CABLE CONSTRUCTION (in multi-office areas):—

You can locate district stations whenever needed, thus improving transmission and reducing the amount of outside construction greatly, without adding any corresponding expenses for operation.

LOWERS TOLL OPERATING COST:—

By means of dial calling devices, incoming long distance calls can be handled automatically, thus reducing the number of operators needed at your toll board. The increased speed of making connections thus secured gives a higher efficiency to your line, cutting down the number of circuits required.

LESSENS ADVERTISING:—

Automatic service is popular with the public and it is easier to induce people to become subscribers. Furthermore, your patrons, being satisfied, are prompter in their payments, thus reducing collection costs.

We have made these savings for others,
We can make them for YOU

Automatic Electric Company

CHICAGO

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Grinnell REZISTOL Leather Work Gloves

are a great protection against electric currents

This leather, subjected to a "high voltage, break-down test" by a well-known testing engineer did not puncture below 4,000 volts.

Resist wear, too. Outwear two to three pairs of other gloves.

Guaranteed not to harden, peel or crack from service. Unharmed by wetting. You can wash them, when soiled, in soap and water or gasoline. Dry out like new. You'll save money in the end, as well as have constant protection against injury, if you wear **Rezistol** Gloves.

Pair Free Ask your dealer for **Rezistol** gloves—a new glove of the famous Grinnell line. If he dosen't handle Grinnell gloves, write us his name and your size. With his first order for our 4-dozen assortment we'll include a pair for you **Free.**

*Folder telling all about **Rezistol** gloves, prices and samples of leather, with report of testing engineer, sent on request. Test the leather yourself.*

Morrison-Ricker Mfg. Co.
133 Broad Street
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FRENCH Telephone Cells

Are Manufactured and Shipped
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There is no reason why the dry cells *you* use should get old in transportation and stock rooms before you install them.

Your orders will be shipped the day received.

Send for new price schedule.

FRENCH BATTERY & CARBON CO.
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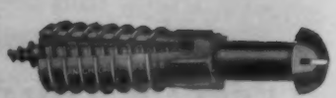
"LONG SAUT" Combination Cable Clamps and Bridle Rings

(PATENTED)



Unsightly pole lines are eliminated in the built up sections of towns by attaching lead-covered cables to the rear walls of buildings, with LONG SAUT Cable Clamps.

"Diamond N" Expansion Shields provide a most secure fastening when LONG SAUT Cable Clamps are to be attached to brick, stone or concrete walls.

LONG SAUT Cable Clamps and "Diamond N" Anchors furnish a combination that has stood the test of time.

For ten years in actual service in New York City and in other sections of the country.

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Manufacturers of the 7,000,000 "Bell" Telephones

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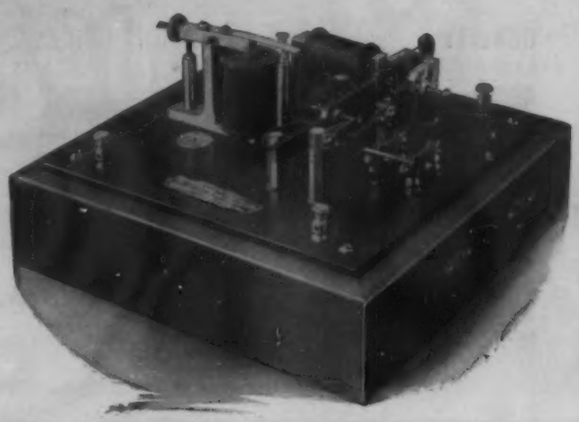
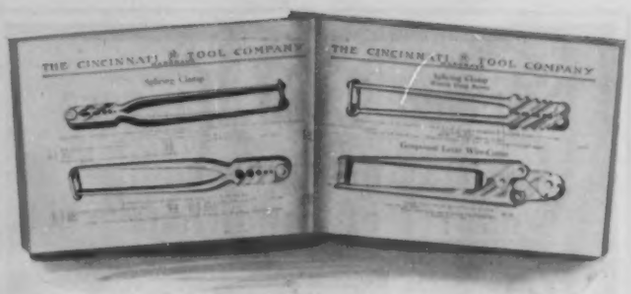


20,000 Standard Pole Changers Sold in 20 Years

They do all you can expect of a pole changer—are reasonable in cost—easy to operate—require no attention and only use current when the operator signals. Write for literature. A Warner Pole Changer will improve your service.

Warner Electric Co.
Muncie, Ind.



Have you sent for a copy of this catalog?

It contains illustrations of all the HARGRAVE Tools for telephone service. It incidentally gives a few of the reasons why these tools do such good work.

The grip—the looks—in fact everything is just right.

Did you ever hear of a HARGRAVE Tool not making good? Ask the man who uses a HARGRAVE Tool what his opinion is of it—and you, too, will become a HARGRAVE user.

Don't forget to write for our catalog.

CINCINNATI TOOL CO.
CINCINNATI :: OHIO

ELAPSED TIME

is what a Telephone Company sells to the consumer of its Toll Service. It is as much a commodity as sugar, flour, or tea sold by a grocer.

In fairness to both company and public this service should be accurately measured. The toll operator's estimate or guess as to the time consumed in a toll conversation may mean a loss to either party—it is generally a loss to the company.

It is so much easier to mark down the minimum charge and have no question raised, than to try to collect for "excess time" when one is not sure.

The CALCULAGRAPH

Is the scale which accurately weighs toll service. It records **Elapsed Time**—the number of minutes and fractions of a minute a toll circuit is in use. It is fair to both company and the purchaser of its service. It furnishes indisputable data for collecting pay for all "excess minutes."

The use of The Calculagraph will also save time of the operator and improve the quality of service.

The Calculagraph has been the standard instrument for timing toll messages in every country in the world where there are telephones, for 15 years.

Calculagraph Company

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Send—Don't Take

When your subs need cells P. P. 'em in a Rite Way Case

This weatherproof case holds two Red Seal dry cells and weighs less than 6 lbs.—cells and all.

If desired can be supplied with batteries connected and with lead wires all ready to hook up.

Particulars on request.

Manhattan Electrical Supply Co.

New York Chicago St. Louis San Francisco

Factories: **Jersey City, Rovenna, O., Cincinnati**

Swisher Cable Hangers

"stay put" under all sorts of conditions

They can't unhook. The Marline is "firmly secured"—and so is the cable.

Thousands of 'em in service and everyone giving satisfaction.

Easy to put on—it is the work of a minute. Made of the best grade of Long Line Pure American Hemp. Hooks are hot-dipped galvanized after they are formed.

May we send you samples?

NATIONAL
TELEPHONE SUPPLY CO.
CLEVELAND ::: OHIO

QUALITY RIGHT PRICES

POLES

SIX YARDS PROMPT SERVICE

REPUBLIC CEDAR CO.
MARINETTE, WIS.

WESTERN CEDAR POLES

AN EXCELLENT ASSORTMENT AT GOOD PRICES
DENNIS BURK & COMPANY CABINET, IDAHO.

Manufacturing red cedar poles daily. Can ship same day order is received. Get our quotations.

C. F. EWING & CO., Ltd., Sandpoint, Idaho

Our Service Has Made Us What We Are

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MONARCH
ELECTRIC & WIRE CO.
622-630 West Adams Street
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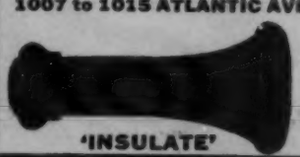
You don't care how large we are but it's service and prices that you are interested in. We get supplies in the very largest quantities, entitling us to the best discount—we can buy on such a large scale because we have the demand—telephone companies buy of us because they get service. Do you want the best prices and the promptest service? Write us.

"Cypress"—*The Wood Eternal*

For Telephone Poles. Sound centers; they are stronger. We are producers; write us.

SHERMAN-BENNETT CO., 214 Fisher Bldg., Chicago

GENERAL INSULATE COMPANY
1007 to 1015 ATLANTIC AVE., BROOKLYN, N. Y.



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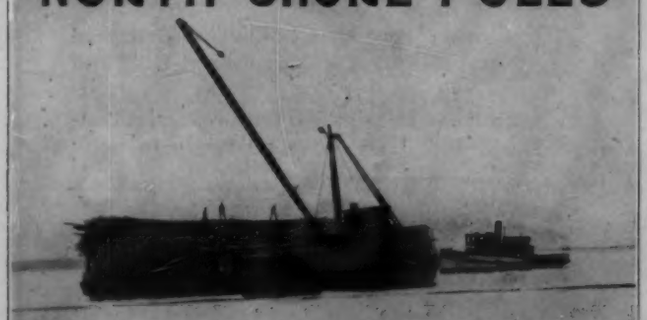
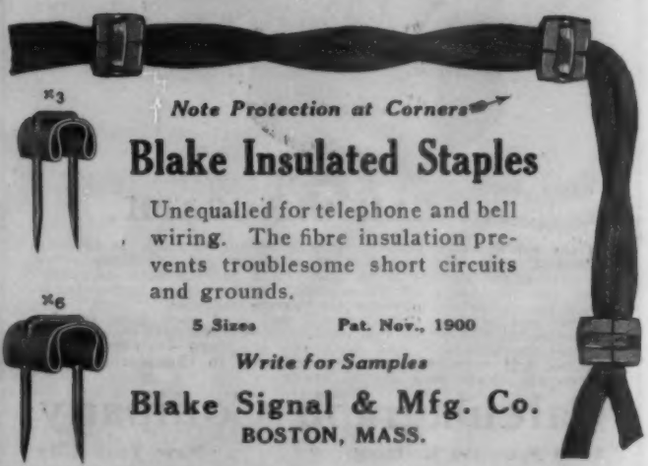
Telephone Receiver Shells, Mouth-pieces, Handles and Electrical Insulations; Cheerfully Quoted.

"NORTH SHORE POLES"



DULUTH LOG COMPANY – DULUTH MINN.



Note Protection at Corners

Blake Insulated Staples

Unequalled for telephone and bell wiring. The fibre insulation prevents troublesome short circuits and grounds.

5 Sizes Pat. Nov., 1900

Write for Samples

Blake Signal & Mfg. Co.
BOSTON, MASS.

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Pole & Tie Co.
5 South Wabash Ave.
Chicago, Illinois

The Trinity in Poles
"Service—
Price—
Quality."

POLES

POLES

THE MAC GILLIS & GIBBS CO.
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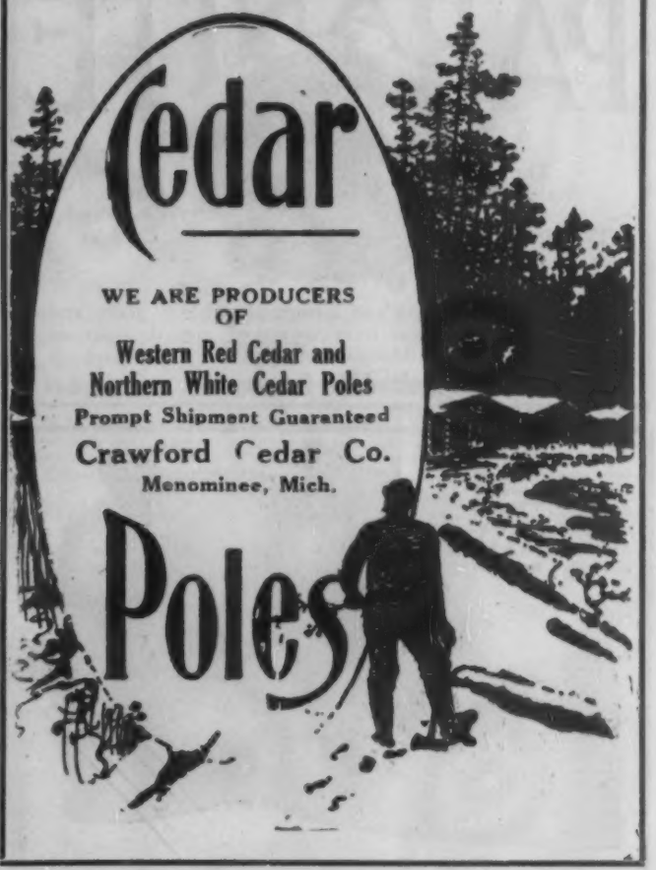

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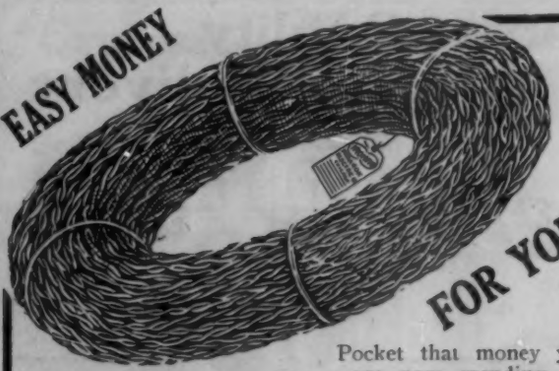

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WHAT KNOWLEDGE DOES.

Knowledge is that which, next to virtue, truly and essentially raises one man above another—Addison.

Fair Words Are Not Enough.

In an article entitled "Wrong Ideas About the Bell System," which appeared in a recent issue of Public Service, N. C. Kingsbury advances some interesting theories regarding the American Telephone & Telegraph Co., of which he is vice-president and one of the most influential executive heads. Since the days of bitter warfare between the Bell and Independent telephone forces, there has been more or less negotiation between the two interests; and Vice-President Kingsbury, in many cases, has been the spokesman of the big corporation. It is only fair to state, too, that he has done much to establish the idea that the Bell was not all horns and tail and pitchfork. In fact, it was almost impossible to harbor the notion that so urbane a gentleman as Mr. Kingsbury could be connected with a corporation possessing those ear-marks of a devilish octopus.

In the article referred to, Mr. Kingsbury argues that the Bell system is not a monopoly and does not want to eliminate competition in the telephone industry. Independents will agree with him on the first proposition. They know their own strength too well to concede that the Bell has a monopoly. As to the other statement—that the Bell does not desire to kill competition—they are not so sure. In fact, history would tend to prove the very opposite; otherwise, why the hard persistent fight on the part of the Bell to destroy Independent competition?

We all know, of course, that of late years it has been the part of wisdom for big corporations to deny the accusation that they are monopolies. Twenty years ago, they courted this distinction and gloried in the claim that they were the whole thing in their particular fields. But this has not been a popular or profitable role to play since the federal government began its crusade against the trusts. In fact, as Mr. Kingsbury candidly says: "It is a dangerous thing to be a monopoly at the present time. It is a dangerous thing to claim to be a monopoly, even if you are not, and it is even a dangerous thing to pass the accusation by without an emphatic denial. It is well to know just the facts in regard to competitive conditions in this country. Now we are not a monopoly, and, furthermore, we do not want a monopoly. The responsibility of financing the entire telephone needs of this country is in itself enough to cause the bravest man, or set of men, to shrink."

Right there he laid his finger on the vital point of the whole matter. No doubt this phase of the telephone situation has had more to do with influencing men on both sides to urge the cessation of destructive warfare than any other factor. The financial needs of both Bell and Independents are so great that wise men have declared there should be an end to wasteful competition so that both sides can devote that mis-spent energy and money to constructive development of their opportunities.

Reading between the lines, it is easy to see that the Bell executive wishes it understood that there is room for both sides and that a policy of "live and let live" will enable Bell and Independents to build up their business and make money in their respective territories. Mr. Kingsbury, in the same article, touches on the purchase of Independent telephone plants by the Bell, and alleges that these mergers have been at the solicitation of its competitors. To quote him:

"The question of merger, of purchase, or sale, has been a prominent question with us for the last few years, because in a great many instances the owners of the different telephone companies have wished to sell; and I believe in no instance have we gone of our own volition to an Independent company for the purpose of urging it to merge its property with ours, or to sell its property to us; and I believe this is a fact that we have withdrawn from a larger extent of territory in the past five years than we have entered."

May be, the Bell did not openly and directly urge Independents to sell out, but undoubtedly it was the Bell's savage and unfair competition in many cases that virtually drove Independents to get out of the business. There is more than one way to accomplish an object. You can politely request a man to do a thing, or you can hold a gun to his head and compel him by force of arms. In either case, the result is the same.

So far as the operating branch of the business is concerned, there doubtless is truth in the statement that the Bell is more anxious to "live and let live" than ever before. The watchful eye of the government on all monopolistic maneuvers and the threat of government ownership of telephones, combine to persuade the Bell to pursue a less aggressive policy in its operating branch. The same cannot be said of the manufacturing end of the business, however, and right there is where the Bell is again courting trouble.

It is rankly unfair for the Bell-Western Electric Co. to seek Independent business, and particularly when it employs cut-throat tactics to capture orders from Independent manufacturers who are entitled to them. This unholy alliance of the Bell and Western Electric Co., for the purpose of winning Independent trade, should be abolished, or the Bell operating field should be thrown open to Independent manufacturers. If the Bell officials mean anything by the fair words just quoted, they should end the outrageous situation in the manufacturing field.

Independent operating companies owe a big obligation to Independent manufacturers and should patronize the men who made it possible for them to go into the telephone business when there wasn't a ghost of a show to buy apparatus from the Bell factory. Now that the Bell factory it reaching out for Independent trade, the Independent operators should—not only out of gratitude but for hard business reasons—buy their equipment from Independent manufacturers. They deserve all the patronage in the field they have helped to build up.

Sand and Imagination

By HERBERT KAUFMAN

The Forty-niners rushed West to take gold out of the ground—nowadays men settle there to put gold into it.

Nature is parsimonious, and carries limited stocks of everything. Her wealths are "show" samples for man's inspection. He may help himself to the limit of her ready made stocks—and after that, he must go in need or help himself.

The multiplicity of our necessities—the enormous range of our activities—would quickly exhaust the yield of field, and forest, and mine, and impoverish future generations of substance and sustenance if we did not exercise our wits and analyze the processes of creation.

Men are poor and ill-fed only where they are lazy and incurious. The scheme of Providence grows more apparent as we grow older. It is our manifest lot to rise through the exercise of our splendid faculties. We fail greatly only through doubt of our destiny.

We can replace whatever we efface. The basic elements for the reproduction of all inanimate utilities are present in the earth, the water, and the atmosphere. Science is merely organized curiosity—a combination of common sense and dauntless purpose. Brave brains accept no impossibilities.

Deserts are future farmlands and city sites. Where there is soil and sun, there can be everything. The richest orchard districts of the continent were recently dread barrens. The Imperial Valley, itself—now eager with grove and granary—was transformed over night by the magicry of an adventurous mind. The best oranges we know are a mixture of sand and imagination.

The earth over, Fortune lies masked, mutely challenging human will to dig and irrigate. The maddest dream of Midas was an inadequate measurement of the wealths lurking over the head and under foot, eventually to yield before intelligence.

All disasters and devastations are puny incidents in the course of progress. At moments we pay awful prices, and seem bankrupted through elemental and human havocs. But the recuperative strength of the race defies adversity, and denies failure.

We are lineal and leal descendants of Anteus, and giant-like, we are hurled from our footing, only to rise, greater and finer, and bolder than before.

While self-faith is potent all is possible. Just sand and imagination—we need nothing else.

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Public Relations of Utilities in Theory and Practice

"The Public Be Benefited!—Persuade the Public It Is Being Benefited!"—The General Problem of Utility Regulation—Some Fundamental Matters—Methods of Regulation that Will Help—Direct or Specific Legislative Regulation Versus Commission Regulation

By Public Relations Engineer

The time is rapidly approaching when the legislatures of a number of the states will be convened. The laws affecting utilities will be up for consideration. Utility men will be forced to recognize that the interests of their companies, the interests of their patrons and the interests of the public with regard to utility affairs, will be affected.

It may be well, therefore, to consider some things which are of fundamental importance. It may be well to consider certain features of the laws which have already been passed. Also, to consider what certain authorities have to say concerning the general problem of utility legislation.

Necessity Originated Utility Legislation.

We have already tried to set forth the fact that the public has something of the same kind of an interest in a utility that it has in a wagon road. We have tried to show that, for the preservation of civilization and for the perpetuation of progress, the people must exercise an increasing amount of control over their public utilities. We have tried, also, to show that in order to exercise control in such a way as to benefit the public, the people must be correctly informed and properly persuaded. We have tried to make plain the imperative demand which exists for boards of public sentiment—to lead the sentiment of the people as unerringly as possible in the direction of the common good.

We have tried to establish the fact that the public is a majority share-holder, the majority control of every utility; and, that the efficiency of the utilities is more or less affected by the trend of public sentiment.

While it seems perfectly plain that public sentiment was the cause of the enactment of the laws which are now in force for the regulation of utilities, is it not a fact that necessity was back of the sentiment? Is it not a fact that necessity was the real origin of our utility legislation?

But while necessity was the origin of regulation; and, while public sentiment—finally enacted into law—was but the expression of the public's need, it seems plain to the writer that this necessity has been used as a convenience by certain political demagogues; used as a convenience, also, by certain utility patrons. On the other hand, we must say that this necessity for legislation has been used as a convenience by certain promoters of utilities.

So far as the enactment of laws for the regulation of utilities is concerned, it seems plain that public sentiment has not always been directed unerringly in the direction of the common good. We think it would be well, therefore, if utility men might agree more or less unanimously concerning the relative importance of a few of the things that are most fundamental.

Matters That Are Fundamental.

What are five or ten important or fundamental matters? What is the order of their relative importance? The writer will offer his own opinion in answer to these questions—not with any assumption that it is correct nor that it will be final; but rather, in the hope of causing discussion or provoking thought.

I. The right and duty of the public to exercise its majority control over every utility for the common good, might be safely assumed, we think, to be the point that is most important and most fundamental.

II. The fact that necessity created the public sentiment which demanded utility regulation, might be listed as the matter of second importance.

III. The fact that this necessity for utility regulation has been grasped and used as a *convenience for the accomplishing of the unpatriotic and selfish purposes* of political demagogues and for the accomplishing of the selfish purposes of utility users and utility promoters, might be mentioned as the matter that is third in the order of importance.

IV. The various reasons why the public is compelled to exercise control over public utilities, together with the various practices by which this needed control has been and is being attempted, might be mentioned as a matter that is entitled to the fourth place in the order of importance.

Most of the lines of endeavor that are now called utilities, originated as private affairs, exactly the same as the undertakings that are still called private businesses.

The writer has read that when private capital proposed building the Union Pacific Railroad westward from the Missouri River, public sentiment was expressed very freely. The opinion prevailed that there would not be enough freight and passenger traffic combined to pay for running a mixed train across the continent twice a week. If that prediction or prophesy had proven to be reliable, there would be no utility problem today, so far as trans-continental railroads are concerned. Furthermore, as long as a public sentiment of that sort prevailed—as long as circumstances and conditions seemed to encourage that sort of public sentiment—there was no need for utility regulation.

The Natural Method in the Beginning.

Unregulated private ownership of utility property and unregulated private operation or management of utility business, was, therefore, the natural state of affairs, *as long as private endeavor was proceeding contrary to the guess, the prediction or the prophesy of the public.* And, as long as this original erroneous guess on the part of the public prevailed, private ownership of utilities was taken as a matter of course.

It is well to remember that there was no thought of regulating utilities until this guess or prophesy was found to be wrong. It is well to remember that in the beginning the private ownership and operation of utility business was looked upon as the only proper method.

The writer was in the employ of a railroad on the day that the Interstate Commerce law ended the privilege of giving passes and special rates to whomsoever the managers of the utilities saw fit. I had been brought up on a farm. I had the idea which then prevailed, and which still prevails as to the absoluteness of the farmer's ownership and control over his lands and his other property. Therefore, it seemed to me that if the proprietor of a railroad was not allowed to do as he pleased with his own, it would not be possible to operate it satisfactorily.

Two Methods of Regulation.

Public ownership and public operation of certain of the more important utilities is one of the methods now being tried out by the various nations of the earth. This is one of the means by which the public exercises its majority control over utility practices. Public regulation of privately operated utili-

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ties is the other method. The method last mentioned is being tried out in the United States.

V. We have, therefore, as a matter that is fifth in importance, this fact: We are living at the time when and in the place where a practical test is being made of three different methods. First, the original unregulated private ownership and unregulated private operation. Second, public ownership and public operation. Third, public regulation of privately operated utilities.

Testing Theory by Experience.

As already explained, unregulated private ownership and private operation of utilities became the practice, in the first place, by reason of the natural trend of events. Practical men, falsely so-called, originated and continued the unregulated privately owned and privately operated businesses which eventually grew into utilities. They were impractical in proportion as they overlooked the theoretical feature of their undertaking. They overlooked the fact that the greater the growth of their venture, the more surely the primitive practice of unregulated private ownership and private operation would become impracticable. They overlooked the fact that the people would be compelled to regulate them as soon as their businesses succeeded to the point where a considerable portion of the people became dependent upon them. They overlooked the fact that they were following a practice that was contrary to correct theory.

Private vs. Public Operation of Utilities.

In the consideration of the problem of utility regulation, the matter which seems to the writer to be next in order is this: Will private operation excel public operation? Perhaps it would be better to put the question thus: Do the managers of privately operated utilities appreciate, as they should, the fact that experience will determine which is more satisfactory to the public, regulated private operation or public operation?

Is it not a fact that in order to justify themselves, in order to maintain their claim for the preference of public sentiment, the present managers of privately operated utilities must make their plan more satisfactory to the public?

From several points of view this last mentioned question might appear to be more important than any of the matters hitherto mentioned; and, after the matters previously mentioned have been taken into account, it certaintly is the problem of first importance to utility men. The only excuse one can offer, for mentioning ahead of it those other factors which lie beneath and behind utility regulation, is this; the writer believes that regulated private operation of public utilities will excel public operation—*provided the regulation is of the kind that helps and not the kind that hinders or interferes.*

How to Secure Regulation that Will Help.

How to secure regulation that will help rather than hinder becomes, therefore, the all-important question for the leaders of privately operated utilities. It should require no argument to show that the leaders of utilities must themselves know which of the many matters pertaining to governmental regulation are most fundamental—which method is most beneficial to the utility company, to its patrons and the public. It needs no words to prove that they must agree as unanimously as possible concerning the four or five most important and most fundamental matters pertaining to regulation.

With regard to utility regulation, it is the writer's conviction that the thing which should be classed as having the place of first importance, is: As unanimous an agreement as possible in answer to the question: "What is a utility?"—as unanimous an agreement as possible in answer to the question: "What is the difference between those departments of human endeavor which are popularly supposed to be utilities, on the one hand; and, on the other hand, those undertakings which are still referred to as private undertakings?"

While we have already dealt with these questions it seems necessary to make such repetitions as may be necessary to cover two points.

First, nothing but the enactment of a law by a state legislature or the Congress of the United States can determine that any particular business is a utility. The businesses which have been declared by law to be utilities are, in all probability, more closely related to the public and of greater importance to the people than the businesses which have not been so declared. But it is important for a utility man to keep in mind the fact that it is nothing more nor less than an arbitrary act of law that separates his undertaking from other departments of human endeavor. It is important that he should keep in mind the fact that it is nothing more nor less than act of law that makes his business a utility.

Second, it is equally as important that the utility man should remember that, as a rule, the law which declares his undertaking to be a utility is the result of public sentiment.

Third, he should keep in mind the fact that his undertaking has been declared by law to be a utility because public sentiment deems it so important that it must be regulated for the common good.

While the utility leader should recognize the power of sentiment which has separated his business from a private undertaking, enacted laws and thereby made his business a utility, it is even more important that he should familiarize himself with the necessities of the case which forced public sentiment to express itself in regulative laws.

Sources of Information.

It seems safe to assume that many leaders of utilities are not as familiar as they should be with the fact that there is an important organization in the United States known as the National Civic Federation. Safe to assume, also, that the average utility leader does not appreciate as he should the somewhat quiet, but none the less effectual influence that is being wielded by this association. Safe to assume that few, if any, of us appreciate the extent to which this association and its administrators lead those who are leaders of the sentiment which affects public utilities.

How many of the readers of this and similar utility journals, know that this National Civic Federation has a department devoted to a study of the regulation of "interstate and municipal utilities."

What proportion of the readers of this journal know that this department of that association has printed a book of almost 1,300 pages entitled "Commission Regulation of Public Utilities"? What percentage of the readers of utility magazines know that the preparation of this volume required the following:

> . . . the gathering together of the laws which have been enacted by 43 states and the federal government, the physical dismemberment thereof section by section and sometimes sentence by sentence; and the classification and arrangement of the individual points into a compact and harmonious whole. The process might be likened to separating from a hay stack wisps of a particular kind and then sorting them according to some 300 characteristics—the differing characteristics being discovered and determined while the work of sorting was in progress?

The writer wonders what percentage of the readers of this and other utility publications—and more especially what percentage of the utility men who are not much given to the reading of magazines of any sort—have been informed of the existence of a book of about 200 pages which was compiled and published under the direction of the State Historical Society of Iowa, in 1912, under the title of "Regulation of Urban Utilities in Iowa."

Among the leaders of thought in the utility realm, how many know that in this last mentioned publication there is a table which gives comparisons and contrasts of the make-up

of the utility laws of the various states concerning such important items as

(a) Method of electing or appointing the commission.
(b) Annual expenditures.
(c) Difference, if any, between the regulation of gas, electricity, water, warehouse, railways and telephones.
(d) Issuing of securities.
(e) Valuation.
(f) Uniformity of accounting.
(g) Method of fixing rates.
(h) Regulation as to standards of service.
(i) Treatment of franchises.
(j) Attitude toward municipal ownership.
(k) Attitude toward competition.
(l) Effect of commission rulings, etc.

Importance of Knowing All the Elements.

"The difficulties between the patrons and the managers of utilities, is due to their failure to understand all the elements that enter into the cost of service," says Dean Cooley. The public more or less generally fails to consider all the elements of cost. Even utility men themselves, have failed, also, to consider the elements of cost. One of the serious things about utility legislation is this failure on the part of the people in general and on the part of many of the leaders of utilities, to understand all of the elements that are involved.

The most serious thing is that the men who make the laws, the men who think they are endeavoring to influence law-making in favor of the patron, and the men who think they are endeavoring to influence law-making in favor of the utility owners, all fail more or less in this matter. They all fail to understand certain important elements involved in the problem with which they are dealing.

Regulation Versus Legislation.

There are two general practices into which the various efforts of the legislators naturally divide themselves—when we come to consider what has already been done in the way of enacting laws for the regulation of utilities. These two practices are:

First, regulation by legislation; and

Second, regulation by a commission or regulative board.

When, by the enactment of specific laws, a state undertakes to regulate the minutest details of utility practice, that method is called regulation by legislation. Whereas, on the other hand, when a state creates a commission and authorizes it to determine the details of utility procedure, that is called regulation by commission.

To illustrate: on page 8 of the volume entitled "Commission Regulation of Public Utilities," we read:

> Provisions prescribing by legislative enactment specific facilities and standards of service and specific safety appliances and standards of safety, even when enforcement is left to the commission, have been excluded. These laws are examples of the old system of direct legislative regulation. The present day tendency is to confer upon administrative commissions sufficient authority for effective regulation in these matters.

After the point has been established that regulation of the utilities—in some manner—is demanded by the very nature of our progress; and, after agreeing that legislation is an unescapable part of this inevitable regulation, may we not agree that the item which is next in importance is, that each and all interested in legislation shall know there are these two distinct and widely differing lines of practice? One is that which "Commission Regulation of Public Utiltes" refers to as the "old system of direct legislative regulation," prescribing specifically for the minute details. And another, that which confers upon the administrative board or commission all the authority that may be necessary to effect regulation—without specific legislative enactment concerning every detail.

Experience in the practical affairs of utilities has convinced the writer that a just and reasonable rate for utility service is demanded very much more enthusiastically by utility patrons when it is popularly supposed that the inauguration of justice and reason will bring about a reduction, than if it were feared that justice and reason might require the raising of rates.

A Justifiable Strategy or Defence.

Some time ago the writer was a member of a committee which represented the utility men of a Middle West state with regard to their interests concerning the acts of the legislature then in session. A law requiring the use of reasonable and just utility rates was being strongly favored by the utility men of that state.

In the beginning certain legislators had been very enthusiastically in favor of the enactment of a law of this kind. But they became surprised when they discovered that the utility men were in earnest so far as the favoring of the law was concerned. These legislators asked the writer whether the utility men were favoring the law because of their belief that justice and reason would raise rather than lower the rates. They were told that utility men quite generally were confident that the rates would be raised rather than lowered if a law were enacted requiring just and reasonable rates.

These legislators lost their enthusiasm as soon as they became convinced that justice and reason would raise the rates. By their action they said: "Utility patrons want regulation of utilities; they want just and reasonable rates; but they want a utility commission and just and reasonable rates because they are convinced that the existing rates are too high. We are convinced that the utility men know more about this matter of rates than it is possible for the patrons to know about it. We can see that these utility men want justice and reason because of their assurance that it means higher rates. But if we enact the law we will disappoint the utility patrons. Their enthusiasm for just and reasonable rates is due more to their desire for cheaper utility service than to their patriotism. They are our constituents. We depend upon their votes for our re-election. Our own enthusiasm for this proposed law was due more to our desire to please the voters who elect us, than to our desire to be just or generous to the utilities. If we should make the mistake of enacting a law that would raise the rates of our constituents, we could hardly hope to be re-elected. Therefore, believing that the utility patrons are mistaken and that the utility companies are right concerning the justice of higher rates, we shall oppose the law which in the beginning we favored. We shall oppose the enactment of a law which by the establishing of the rule of justice and reason would raise the rates of our constituents. We are in favor of the rule of justice and reason as regards utility rates on the sole condition that it shall reduce and not raise the rates."

Legislative Injustice.

By the "old system of direct legislative regulation," an unjust rate can be loaded upon utilities. It is important that utility men should understand this. It is important that every utility man should know the difference between the two methods of legislation.

We have a concrete illustration in the recent request which the regulative commissions of Arkansas, Missouri and Oklahoma made to the Interstate Commerce Commission. By the old system of direct legislative regulation the rate of fare for carrying passengers on the railroads was established in each of the above mentioned states. The law names a two-cent a mile rate. Neither the Interstate Commerce Commisson nor the United States Congress has established a two-cent rate for interstate passenger fares. The railroads continued charging on the basis of three cents a mile for passengers traveling across state lines. This made the through rate for interstate passenger fares higher than the combination of the rates to the dividing line.

The regulative commissions of the three states petitioned the Interstate Commerce Commission to prevent the railroads from charging more than the "sum of the two locals." They petitioned the Interstate Commerce Commission to prevent roads from charging more than two cents a mile for trips across state lines.

But, upon the evident assumption that two cents a mile is less than is demanded by reason and justice, the Interstate Commerce Commission refused the request of the regulative boards of Arkansas, Missouri and Oklahoma.

Now, if a law had been passed by the United States Congress naming two-cents-a-mile as the rate of fare, this would not have been a question of justice or reasonableness. It would have been a question of law.

There would have been no other alternative for the Interstate Commerce Commission in its relationship to the interstate rate—just as there is no other alternative for the regulative boards of the three before mentioned states. The Interstate Commerce Commission would have been compelled to ignore what it evidentally believes to be justice and reason. The railroads might appeal to the supreme court on the grounds that a two-cent rate was unreasonable and unjust. The court might decide in the railroad's favor—eventually. But in the meantime the commission would be compelled to demand that the railroads use the two-cent rate prescribed by law. The two-cent rate would control until the courts over-ruled the error made by legislative regulation. But as it is, the Interstate Commerce Commission has authority to find out what is just and reasonable and act accordingly.

This same principle and practice follows all the way through —as regards standards of service, standards of equipment, standards of accounting, etc. Utility men have every reason for favoring what the National Civic Federation calls the preferable method of regulation. By this method broad authority is given to a competent commission. Utility men have every reason for opposing the "old system of direct legislative regulation."

As patriotic citizens utility men have a duty to perform. If utility rates are unjustly or unreasonably low it will bring a benefit to the utility leader if justice and reason are established. But it will be a merited benefit. And the common good cannot be advanced by denying merited benefits. May not justice and reason be demanded by those who will be benefited thereby?

In the United States, utility service is developed very much more thoroughly than in any other country. This development had to be promoted. And there have been bad promoters just as there have been bad men in every other calling. Furthermore the temptation exists for every promoter to secure capital by "making the best possible showing." From the very nature of the case therefore, the promoters of the utilities have been guilty of more or less exaggeration of their profits. As before quoted, "utility men, themselves, failed to understand or take into account all of the elements of cost." One of the reasons for this failure was that it would have cut down their "showing" of profits; and, thereby interfered with their sale of securities.

Exaggerated Profits.

Along with this temptation for the utility promoter to exaggerate his profit, there has been a parallel temptation for the political demagogue to use words from the utility promoter's mouth to convict the latter of charging more than a reasonable rate. And there has been an equal temptation for the utility patron to believe the exaggeration of the utility promoter. A selfish interest which tempts or inclines the utility patron to believe the accusation of the political agitator or demagogue. It has been natural for the utility user to believe everything which meant the possibility of a reduction of rates.

Funds must be provided in some way for the improvement and the extension of utilities. In the future these funds will have to be obtained more upon a foundation of fact and less upon the guesses, promises or prospectuses of security salesmen or promoters. Funds will be obtainable for the improvements and extensions less and less as a matter of speculation and less and less upon mere foundationless promises for publicly operated utilities as truly as for regulated private utilities.

Therefore it seems absolutely necessary and defensible for the utility leader to demand—as any patriotic citizen might demand—that we shall have less and less of "the old system of direct or specific legislation," and, more and more of the legislation which enables a regulative board or commission to find out and to establish the things that are just and reasonable.

Report of Joint Committee on Inductive Interference

Rules Recommended to and Embodied in the Order of the California Railroad Commission—Further Elucidated by Discussion in Committee's Report—Text as Presented at the Pacific Coast Meeting of American Institute of Electrical Engineers

In Telephony of September 12, there was published the order of the California Railroad Commission promulgating the rules formulated by the Joint Committee on Inductive Interference in that state. In its report to the commission, the committee summarized the results of its investigations made since December, 1912. This summary, as contained in a report presented at the Pacific Coast meeting of the American Institute of Electrical Engineers at Spokane, Wash., September 9 to 11, 1914, and embodied in the Proceedings of the American Institute of Electrical Engineers, is as follows:

Results Accomplished.

1. *Interference to telephone circuits under normal operating conditions of power circuits arises almost wholly from the harmonic voltages and currents of the power systems.*

This is due chiefly to the fact that the frequencies of the harmonics, generally present in the voltages and currents of power systems, cover a considerable portion of the range of the voice frequencies, particularly those frequencies at which telephone instruments and the human ear are of maximum sensibility. Extraneous currents of frequencies approaching the average voice frequency have a more injurious effect upon telephone conversation than currents of lower frequencies.

2. *The effect of induction of the fundamental frequency on telephone circuits is comparatively unimportant unless it is of magnitude sufficient to constitute a physical hazard.*

This is due to the fact that the fundamental approaches the lower limit of audible frequencies, at which the telephone and the human ear are not efficiently responsive.

3. *Interference to telegraph and other signaling circuits is due principally to the fundamental and lower harmonics.*

Telegraph receiving instruments are relatively insensitive, as compared with the telephone, to the higher harmonics, but are sensitive to disturbances of lower frequencies, such as the

fundamental and lower harmonics which more nearly approach the normal operating frequency of such circuits.

4. *The power circuit currents and voltages may be divided into two factors: balanced and residual, of which, for equal magnitudes, the latter in general produce the greater inductive interference.*

Residual currents and voltages act inductively in a similar manner to single phase currents and voltages acting in a circuit composed of the line conductors in parallel with earth return, which is a condition favorable to very large induction. Moreover, such a circuit, which includes the earth as one side, cannot be transposed. Transpositions in the power circuit cannot reduce the inductive effect of residuals except as they reduce the magnitudes of the residuals themselves, which they do in some cases. The inductive interference arising from such currents and voltages can be reduced only in the case of metallic circuits such as telephone circuits, by transposing these circuits. It is therefore important that the telephone circuits be transposed at frequent intervals throughout parallels and carefully balanced throughout their entire length and that the residual currents and voltages be kept sufficiently small to give negligible induction in telephone circuits so arranged.

5. *Inductive interference to communication circuits, arising from the balanced voltages and currents, can in a large measure be prevented by means of an adequate system of transpositions applied to both power and communication circuits (assuming the latter are metallic) and located with due regard to each other.*

This is accomplished partly by creating mutually neutralizing inductive effects in neighboring lengths of each side of the communication circuit or circuits, by transposing the power circuit, and partly by equalizing the inductive effects on the two sides of the communication circuit or circuits, by exposing each side equally to the influence of the power circuit by transposing the communication circuit.

6. *Abnormal conditions and at times switching operations produce transient disturbances of a very severe character.*

This is due to the fact that abnormal conditions almost invariably give rise to residuals of large magnitude, often including high harmonics. Abnormal occurrences, incident to electrical power transmission, do not give warning of their occurrence, and since they cannot be produced artificially on transmission systems without subjecting the apparatus to great risk or danger, it has been deemed unwise to attempt any experimental tests of these effects. This conclusion is therefore drawn from general experience and data of actual occurrences collected by the committee.

Discussion of Rules.

In its discussion of the rules promulgated by the commission, the committee says:

It will be noted from the definitions that the terms "power circuit" and "telephone circuit" are used in these rules in a special, restricted sense.

(I) The first and most obvious means of preventing inductive interference is to avoid the close association of power and communication circuits. Further, it is recognized that in no other way can complete freedom from interference be secured. While with the ever-increasing network of electrical circuits of all kinds, adequate separation to avoid interference is becoming increasingly difficult to maintain, the committee feels that the importance of such separation justifies its being made the first premise in rules designed to prevent inductive interference.

Notice, sufficiently in advance, should be given the other party or parties concerned in any proposed parallel in order that thorough consideration may be given by both parties to possible means of avoiding the parallel, or, in case the parallel cannot be avoided, to the necessary remedial measures to be employed.

(II-a) The best insurance against physical hazard, in cases of close proximity, is to maintain a separation equal to the height of the taller line, thus avoiding the possibility of physical contact in case of failure. In the case of crossings and unavoidable cases of close proximity for short distances, extra strength construction is necessary as a precaution against failure.

(II-b-c) As has been pointed out under the heading "Results Accomplished," residual voltages and currents are particularly troublesome factors in causing interference. Means to eliminate or reduce such residuals in power systems are highly important and, while information at this time does not enable the committee to formulate as explicit a rule as is desirable, yet the importance of the subject justifies its inclusion in the rules. The acquisition of further information on which to base a more explicit rule upon this subject is a most important problem, the experimental study of which is discussed in the following section of this report.

(II-d) Transpositions, properly located in both power and communication circuits, offer the most reliable and effective means for preventing interference from balanced voltages and currents of power circuits. While the inductive effects increase in severity for the higher voltage circuits, due in part to the increased separation of the line conductors, which renders more frequent transpositions desirable, the mechanical difficulties involved are so great as to overbalance the other reasons. The rules, therefore, provide for less frequent transpositions in the higher voltage circuits than in the lower voltage circuits. A further reason for frequent transpositions in the lower voltage circuits, is the necessity of a flexible system of transpositions applicable to short parallels which generally occur with such circuits.

(II-e) The provision requiring transpositions outside the limits of a parallel on systems electrically isolated from ground is an explicit measure for carrying out the purpose of the more general provision given under II-b-c, "Balance of Power System" and "Limitation of Residual Voltages and Currents."

(II-f) Non-uniformity of separation and type of construction within the limits of a parallel are inequalities which cannot in many cases be taken into account in the design and layout of transposition schemes. Such inequalities tend to nullify the effectiveness of the transpositions; hence, it is desirable that they be avoided. A precautionary statement is included in the rule in order that the possibility of securing a wide separation for a considerable portion of a parallel may not be sacrificed for the sake of absolute uniformity throughout the entire length.

(II-g) Some types of transformer connections and methods of operation give rise to large residual voltages and currents, and certain provisions of the rules are designed to prohibit or restrict the use of such connections and methods of operation. These rules may be considered as explicit provisions complying with the general provision in II-b-c, "Balance of Power System" and "Limitation of Residual Voltages and Currents." The sufficiency of these specific provisions as an insurance against harmful residual voltage and currents is subject to future determination.

The present information of the committee does not warrant the definite recommendation of any one type of connection or method of operation as best from the standpoint of inductive interference. This is true as to the relative merits of the two general types of systems, the grounded neutral and the isolated system. The advantages and disadvantages of these general types and any modifications of these types are dependent upon their inherent characteristics in respect to residuals and the limitations and control of residuals under both normal and abnormal conditions. Both types are on an equality with respect to the interference caused by balanced voltages and currents.

(II-k) Continued operation under certain abnormal conditions is possible in some power systems. In particular, it is

possible to operate a grounded star-connected system with one phase open, and it is possible to continue the operation of an isolated system when one phase becomes grounded accidently. The former gives rise to a large residual current and the latter to a large residual voltage, both of which are liable to render parallel communication circuits inoperative. For these reasons the rule prohibits such operation, which, aside from the consideration of inductive interference, does not constitute good practice in power system operation.

(II-h-l-n) To provide that operation under these abnormal conditions mentioned, may not continue without the knowledge of the power company, the rules specify that devices for indicating grounds shall be installed on isolated systems. With respect to grounded star-connected systems, the rules specify with certain exceptions the automatic opening of switches by abnormal neutral current. In such systems ammeters are required in all main neutral ground connections. Such ammeters, read regularly, afford means of detecting abnormal neutral currents and are of value in showing the degree of balance of the system, as the neutral current is easily affected by unbalanced conditions.

(II-m) Accidental causes give rise to occasional abnormal conditions. These can only be guarded against by good construction and maintenance, and careful operation which, however, cannot prevent entirely such occurrences. When trouble develops on a power circuit involved in a parallel, it is always liable to cause serious interference to the communication circuit, if the exposure is severe. In the present state of the art, the method of fault location on power circuits is a process of repeated sectionalization and energization of the faulty line until the fault is located within certain limits. This process causes repeated interruptions with loss of time in the operation of the communication circuits, and, in the case of telephone circuits, is accompanied sometimes by injury to the operators.

It should be explained that the loss of time is much greater than the duration of the disturbance, owing to the time required to restore the protective devices on the communication circuits to their normal condition. No method of locating faults on power circuits is known which meets the requirements of practice and yet avoids the disadvantages of the present method. The inductive disturbances, due to fault location, can be to a considerable degree ameliorated by disconnecting the faulty line from the rest of the system and energizing this line by a single generator at such excitation as may be necessary to overcome the insulation of the fault. Whenever practicable, this method is employed by power companies; hence, it has not been thought necessary to cover it by a specific rule.

In view of these facts, the committee is recommending the limitations of the present practice in this regard so as to avoid, as far as seems practicable, the repeated interruptions to communication circuit operation. It is highly desirable that some better method of fault location be developed, not only because of the attendant consequences of the present method on communication circuits, but also because of the abnormal strains to which the power apparatus is necessarily subjected.

(II-h-i-j) Normal switching operations on power circuits produce at times severe transient disturbances in parallel communication circuits. The commonly recognized fact that oil switches produce less severe transient disturbances in power circuits, affords the basis for the provisions in the rules dealing with switches and switching. The automatic features required are designed to prevent continued operation under abnormal conditions.

(II-o) Transient disturbances of severe nature to telephone circuits are sometimes caused by the charging of electrolytic lightning arresters. There are available methods of diminishing the transients due to this cause, and a general provision to the effect that such methods shall be employed when necessary, is included in this rule. It is further provided that the charging of the arresters should be done at times when the telephone circuits are least used.

(I-p-q) Fundamentally, interference to telephone circuits by power circuits in normal operation is largely due to the existence of harmonics in the currents and voltages. While the complete elimination of these harmonics seems impracticable, still beneficial results may be obtained by practical efforts in this direction. The committee feels that the two general provisions as to the wave form of rotating machines and the exciting current of transformers, are of great importance both from a practical standpoint and also as enunciating a general principle. The matter of generator wave form particularly is of importance for all types of systems. The provision with reference to the exciting current of transformers, while desirable in all cases, is particularly so on grounded star-connected systems.

(III) Certain of the measures in II, particularly those referring to power system operation, which are helpful in mitigating inductive interference, have been recommended to apply to existing parallels.

(IV) Since these rules are designed for the protection of communication circuits, it is proper that the companies operating such circuits be given the right to waive any measures of protection which they may in any particular case consider unnecessary.

(V) The committee has undertaken no investigation of cases of parallelism with alternating current railways, but as the seriousness of this class of exposure is recognized, it was thought desirable that it be referred to specifically.

Future Work.

The further work necessary in order to secure the information essential as a basis of determining more explicit and effective rules than those herein recommended, is particularly concerned with the subjects of transpositions and residual voltages and currents. In order to cover these subjects in as effective and economical a manner as possible, it is thought that the procedure should be along the following lines:

1. Experimental study of transpositions, which includes the determination of:

a. The practical effectiveness of transpositions in both power and communication circuits as a means of reducing induction arising from balanced voltages and currents; involving considerations of different co-ordinated transposition schemes particularly with different lengths of power circuit "barrels."

b. The practical effectiveness of transpositions in communication circuits as a means of reducing inductive interference arising from residual voltages and currents; involving considerations of different systems, particularly different lengths of balanced communication circuit transposition sections.

c. The influence of imperfect electrical balance of communication circuits in impairing the effectiveness of transpositions.

d. The practical effectiveness of transpositions in a power circuit isolated from ground as a means of balancing the electrostatic capacities to earth of the several conductors, and therefore reducing residual voltages and currents; involving considerations of the relative efficiency of different lengths of power circuit barrels.

2. Experimental study of the causes and effects of residuals, including:

a. A comparison of the different types of power system connection and apparatus in common use and their characteristics in respect to the production of residuals, particularly harmonic residuals.

b. Means to be employed in limiting residual voltages and currents.

c. A determination of the minimum values of residual voltages and currents which will produce harmful inductive interference.

It is thought that these two studies should progress simultaneously. The work indicated under (1) could best be done

on an actual parallel selected to be as uniform and as free from secondary disturbances as possible. Some preliminary work has been done along these lines which indicate the best methods of procedure and this should facilitate the carrying out of the investigation.

The study mentioned under (2) consists in part of an investigation of the characteristics and magnitude of residual voltages and currents in typical power systems, both those with grounded neutrals and systems entirely isolated from ground. A part of the study of residuals is logically related to the study of transpositions and could be carried out in connection with the study outlined under (1) and at the same time and place.

In addition to the above, the committee has already arranged for the investigation of the two following subjects:

This work is now in progress.

1 A determination of the detrimental effect of extraneous currents on a telephone circuit as a function of the frequency, including a determination of the maximum amount of extraneous current, of different frequencies and combinations of frequencies, which is allowable in a commercial telephone circuit.

2. A determination of the effects of extraneous current of different amounts and characteristics, in limiting the speed of telegraph operation.

List of Technical Reports.

The following is a list of the technical reports which have been prepared in connection with the investigation of the Joint Committee on Inductive Interference:

Technical Report No. — Subject.

1. General outline of tests to be made at Salinas on parallels between lines of the Sierra & San Francisco Power Co., the Western Union Telegraph Co., the Southern Pacific Co., and the Pacific Telephone & Telegraph Co. (6 pages.)
2. Summary of results of tests at Morganhill on parallel between lines of the Coast Counties Gas & Electric Co. and the Pacific Telephone & Telegraph Co. between Morganhill and Gilroy. (8 pages.)
3. A description of the noise standard in use for measuring noise on telephone circuits in terms of a standard unit. (4 pages.)
4. A description of the instruments and methods used for the measurements of effective values of induced voltages and currents. (2 pages.)
5. A description of apparatus and connections used in measuring line and residual currents and voltages of power circuits. (6 pages.)
6. Tests of the effects of opening the secondary delta of the auto-transformer bank at Salinas. (7 pages.)
7. Tests of the induction in the block signaling circuits of the Southern Pacific Co. paralleled by the Salinas-King City circuit of the Coast Valleys Gas & Electric Co. (4 pages.)
8. Tests of the induction in the telephone circuits of exposure No. 2 at Salinas under normal operating conditions of the power system, with particular reference to the effects of grounding and isolating the neutral of the Salinas auto-transformers. (16 pages.)
9. Experimental determination of the coefficients of induction for residual currents and voltages in exposure No. 2 at Salinas. (4 pages.)
10. Measurements of the harmonics of the neutral current at Salinas. (4 pages.)
11. Investigation of current transformers, ratios, and errors due to the use of current transformers under the conditions of the tests. (21 pages.)
12. Formulae for the computation of electrostatic and electromagnetic induction from power circuits in neighboring communication circuits. (18 pages.)
13. An investiagtion of errors in measurements of residual voltage due to the potential transformers used and a discussion of the method of measurement at Salinas. (30 pages.)
14. Comparative tests of the noise in exposed telephone circuits with power on and off the 55,000-volt power circuit of the Sierra & San Francisco Power Co. between Guadalupe and Salinas. (8 pages.)
15. Supplementary to Technical Report No. 8, differing from the earlier report in that the telephone circuits were shielded. Contains a discussion of transpositions. (22 pages.)
16. Tests of the induction in telephone circuits exposed to the Coast Counties Gas & Electric Co.'s 22,000-volt line between Morganhill and Gilroy with the power circuit untransposed and open at Gilroy. (4 pages.)
17. Tests of the induction in telephone circuits exposed to the Coast Counties Gas & Electric Co.'s 22,000-volt line between Morganhill and Gilroy, before and after installing power circuit transpositions. (24 pages.)
18. Tests of the effect, on exposed telephone circuits, of grounding one phase of the Coast Counties Gas & Electric Co.'s 22,000-volt, three phase, delta-connected line. (4 pages.)
19. Tests of the combined effects of the Coast Counties Gas & Electric Co.'s and the Sierra & San Francisco Powr Co.s circuit on the telephone circuits in the exposure between Morganhill and Gilroy. (4 pages.)
20. Tests of the effect on the residual voltage of transposing the Coast Counties Gas & Electric Co.'s 22,000-volt line within the exposure between Morganhill and Gilroy. (3 pages.)
21. Tests to determine the comparative effect on the noise in the exposed telephone circuits of having the power on and off the Coast Counties Gas & Electric Co.'s 22,000-volt line between Morganhill and Gilroy, and the effect of shielding the telphone circuit under test by grounding other circuits on the lead. (4 pages.)
22. Computation of the coefficients of induction from balanced and residual currents and voltages for the telephone circuits of exposure No. 2 at Salinas. (19 pages.)
23. Experimental determination of the coefficients of induction from residual currents and voltages, for the telephone circuits of exposure No. 2 at Salinas—more complete than Technical Report No. 9. (24 pages.)
24. Comparison of computations of Technical Report No. 22 with experimental data of Technical Report No. 23. (16 pages.)
25. Tests of induction in telephone circuits in exposure between Salinas and King City under normal operating conditions, with the neutral, of the Salinas auto-transformers grounded and isolated. (20 pages.)
26. Tests of accuracy of measurement of residual current by certain current transformers. (4 pages.)
27. Tests of induction in telephone circuits in exposure No. 2 at Salinas with the North Beach steam station energizing the Sierra & San Francisco Power Co.'s line. Supplementary to Technical Reports Nos. 8 and 15, differing in the source of supply of the power system. (27 pages.)
28. Supplementary to Technical Reports Nos. 8 and 15. Voltage lowered 5 per cent at the Guadalupe auto-transformers which supply the power circuit. (20 pages.)
29. Determination of impedances of lines, by computations and by measurements—numerous curve sheets and tables. (65 pages.)
30. Tests of induction in telephone circuits in exposure Nos. 1 and 2 at Salinas, with the neutral of the Salinas transformers grounded and isolated. (10 pages.)
31. Supplementary to Technical Reports Nos. 8 and 15 and more complete. Includes tests with Salinas neutral grounded and isolated and telephone circuits shielded and unshielded. (29 pages.)
32. Supplementary to Technical Report No. 25. (22 pages.)
33. Induction in test leads used at Salinas for connecting testing apparatus to the circuits of exposure No. 2 and the effect of such on the measurements of the induction from the exposure. (20 pages.)
34. Effect of changes in the insulation resistance of the telephone line on the induction in telephone circuits of exposure No. 2 at Salinas. Also supplements Technical Reports Nos. 8, 15, and 31. (24 pages.)
35. General outline of tests to be made at Santa Cruz on the parallel between lines of the Coast Counties Gas &

Electric Co. and the Pacific Telephone & Telegraph Co. (4 pages.)

36. Induction in telegraph circuits of the Western Union Telegraph Co. and the Southern Pacific Co. in exposure No. 1 between Salinas and San Jose. (8 pages.)

37. Noise tests on telephone circuits radiating from Salinas, with the neutral of the Salinas auto-transformers grounded and isolated. (4 pages.)

38. General review of tests at Salinas, summarizing reports, 1, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 27, 28, 30, 31, 32, 33, 34, 36, and 37. (53 pages.)

39. General consideration of transpositions and a study of the results to be expected from the application of various transposition schemes to the Santa Cruz-Watsonville exposure. (36 pages.)

40. Method of measurement of capacity and conductance unbalances. (2 pages.)

41. Harmonic analysis of alternating current waves, by oscillograph and resonant shunt. Comparison of the methods. (30 pages.)

42. Investigation of the current transformers in use at Santa Cruz, to determine their ratios of transformation and suitability for residual current measurements. (35 pages.)

43. Outline of tests to determine the effect of extraneous currents on the intelligibility of telephone conversation. (8 pages.)

44. Induction in the telephone circuits of the Santa Cruz-Watsonville exposure and in the test leads, from sources other than the 22,000-volt line. (12 pages.)

45. Induction in the telephone circuits of the Santa Cruz-Watsonville exposure under commercial operating conditions, with the original transpositions in both power and telephone lines. (15 pages.)

46. Supplementary to Technical Report No. 39. A study of additional transposition schemes for the Santa Cruz-Watsonville exposure. (14 pages.)

47. Computation of the coefficients of induction for balanced and residual currents and voltages for the Santa Cruz-Watsonville exposure. (11 pages).

48. Experimental determination of coefficients of induction in the Santa Cruz-Watsonville exposure, with the original transpositions. (42 pages.)

49. Further experimental determination of coefficients of induction for balanced voltages, in the Santa Cruz-Watsonville exposure, with the original transpositions. (13 pages.)

50. Study of the influence of various transformer connections and flux densities on the third harmonic and its multiples in a three phase circuit. (In preparation.)

Safety Rules for Electrical Workers.

The study of life and property hazards incident to the generation, distribution and use of electrical energy includes the consideration of both construction methods and operating practice. Analysis of the available data on electrical accidents demonstrates their preventability in very large proportion by use of definite operating precautions. This is especially true with those accidents occurring to workmen engaged in electrical work.

Rules for construction, installation and maintenance of electrical equipment to safeguard employes and the public are now under preparation by the United States Bureau of Standards. The rules for safety in the operation and handling of electrical lines and equipment, which have just been published as Circular No. 49, proceed from a painstaking study by the engineers of the Bureau of Standards of existing rules and practices. The assistance of state commissions, operating companies and electrical workmen has been freely given to the bureau in this work, and the rules in their present form are offered to the public for criticism, discussion and, so far as may be found desirable, for general adoption.

The scope of the safety rules includes all operation of, and work on or about, power and signal lines, and the electrical equipment of central stations, substations, mines and testing departments. The rules are divided into three parts. The first two parts consist of general rules which apply to the employer and to the employe respectively, and the third part comprises, under separate headings, those special rules which apply particularly to employes engaged in special classes of electrical work.

The section for employers calls for the provision of employes with rules, diagrams and emergency instructions, their assignment to work according to their demonstrated abilities, and the division of responsibility among them in a definite manner so that danger may not arise through conflict on points of authority. The employer is also required to supply portable safeguards to enforce general operating precautions and to supply employes with forms for the adequate reporting of accidents. The final requirement is that the rules for employes be strictly enforced.

Rules for employes in general, are subdivided into six groups. The first enumerates those general precautions, the necessity for which seems obvious but the non-compliance with which is nevertheless responsible for many injuries. The second presents general operating rules, defining the duties and relations of those employes who direct others and the operating methods by which safety is required. The third group prescribes the precautions for handling live parts under varying conditions of voltage and location. The fourth and fifth parts deal with the procedures for assuring the continued safety of work about normally live or moving parts, respectively, by avoiding all possible sources of misunderstanding in killing parts. The sixth group covers, in some detail, the procedure for making protective grounds and short circuits.

The special rules for employes comprise nine separate headings, covering the special hazards of work about electrical equipment in stations, at switchboards, about overhead lines, in arc lamp attendence, on underground lines, meter setting, testing, and in tunnel or mine work. Each class of worker is directed to familiarize himself also with the preceding general rules which apply to all classes of electrical employment. By this arrangement, a more adequate and convenient treatment has been realized without unnecessary repetition.

In a carefully prepared appendix the value of organized accident prevention work through safety committees, is emphasized as a means of re-enforcing the effectiveness of safety rules. The report on this subject by the accident prevention committee of the National Electric Light Association is briefly abstracted, and citations are made from the reported organizations and methods of several large and small electrical utilities.

The comment of those commissions, companies and workmen whose study of the subject has been closest, has been very favorable to the arrangement and substance of the rules given in this circular, and many have expressed a desire to adopt them or to utilize them in preparing similar codes. The requirements of different states and communities should be closely harmonized to secure the best results in reducing the accident toll of electrical service, and the results presented in this code should be advantageous in securing uniformity among the state codes of safety rules.

Great advantage will result to companies and workmen alike by the general adoption by the several states of a single standard set of safety rules, which can be revised in accordance with the progress of the art and the combined experience of all the companies and commissions of the country. Thus will every state and every company secure the advantage of the experience of all.

Where particular rules do not apply, their omission will, of course, cause no conflict in practice. If it is necessary for any state commission to adopt additional rules, that could be done at any time by special orders. This would be easier and less confusing than to have a different set of rules for each separate state.

Inconsistencies in American Telephone Practice

A Discussion of Methods of and Practices in the Plant, Operating and Executive Departments of Telephone Companies Which are not Economical When Viewed from a Combined Engineering and Commercial Standpoint—The Toll Line Plant—Second Installment

By Constructive Critic

In locating a toll lead, the shortest route in miles is not always the most practical. A case came to the writer's attention where a telephone company desiring to build a two-arm lead between two towns 65 miles apart, in order to save four miles in length and to escape some high tension exposures, left six towns and villages from its route. It also left an electric and steam railroad some miles distant. The wagon road, which is the only means of reaching the lead where constructed, becomes almost impassable during the winter season, when the probability of line trouble is greatest. In order to cut the distance every foot possible, cross-cuts were made over hills and through dales. One place, I particularly remember, was through a dense wood for 1½ miles that the intrepid Henry M. Stanley would have deterred negotiating. A swath about 15 or 20 feet in width was cut through this forest. This leaves the line greatly exposed to the hazard of the standing trees falling over the lead during storms, or from natural causes as well as contacts from branches. During one storm no less than 20 trees broke through the lead. Every windstorm of consequence, and it is a windy country, means lines—yes, a whole lead—out of service.

The foreman on this piece of construction believed in taut wires—they looked neater. He also believed in guying and bracing the lead extra strong—in case of a falling tree. Now, whenever a tree crashes through the lead, the taut wires, pulling each way from the break, invariably cause the first poles each side of the break to be pulled back. When a tree strikes a guy or span brace, it means broken wires or a broken pole, sometimes both.

The point I want to bring out here is the inconsistency of building well from the point of the construction engineer solely, and ignoring considerations of subsequent maintenance, not to mention the traffic and commercial aspects of the case. It is not simply a matter of expense incident to employing more maintenance linemen to be in readiness day or night together with the cost of rigs, but it is the disrupting of matters at the toll offices and the loss of business and prestige that cuts into the net profits.

It seems inconsistent to build strong leads, having the object to better withstand damage by falling trees when the cause should be removed, even at a greater outlay. When a lead is out for half a day—the one referred to has been out as much as four days at a time—the loss in gross revenue incurred may reach a large sum. And that is what must be figured on when building, since salary and other expenses while operators are idly waiting, will go a long way toward sustaining a greater construction cost due to clearing the right-of-way. The latter, too is a permanent investment.

Toll Lead Location.

In the case referred to, high tension lines are now near the lead a considerable portion of the distance between the cities. This indicates that, in our day and age of electrical development, all leads should be built in anticipation of such exposures. This lead has some of its circuits transposed every two miles, which had to be changed to more frequent transpositions to reduce induction disturbances.

As stated above, four miles of distance between the two cities were saved by taking the most direct route through wooded territory. This was at great cost, comparatively, due to the fact that all poles and material had to be hauled by team a considerable distance, aside from the tree-clearing expense, which was very heavy. There is still another aspect of the case: Whenever the industrious farmers along the route take a notion to blow out a few stumps, wires are broken and service interrupted as a consequence. True, there is a law and its "recourse" against such damage, but what chance does a telephone company stand to recover even structural damage in an action against a "poor" farmer before a jury of his peers?

"Bucking the Inevitable."

However, if one of your linemen should, to clear wires, cut a crooked limb from a scraggy oak standing by the roadside, "ill luck" would surely make it the hallowed tree one of the owner's distant progenitors grew from an acorn, which this revered ancestor himself plucked from the spreading branches of the then sturdy Charter Oak of historic lore. Besides, it was the very tree under which his great grandfather plighted troth with his beloved great grandmother who now slumbers 'neath the unkempt sod in the churchyard!

When you defiantly, with that "millions for defense but not one cent for tribute" feeling within your bosom, seat yourself at the table with your counsel before "His Honor" in the dingy little courtroom and listen to the doleful tones of the plaintiff, and look upon the sad wife and grown up daughter as they recount the "cherished memories" associated with the alleged maimed "monarch of the forest"; and you hear the varied testimony given by the countryside dwellers under the questioning of the county seat shyster—you begin to wonder when your well-groomed counsel at your side will deal the "plexis blow" and end it all. But you have not reckoned with your "host." You have overlooked the fact that the plaintiff's lawyer has served three terms in the legislature, read the Declaration of Independence two years in succession at the grove on Independence Day, and that he was chairman of the reception committee the day the President's train went through behind time and did not stop.

After you have listened to the silvered eloquence of the "village pride" addressing the "gentlemen of the jury"—the "twelve good men and true"—and noted their sympathetic admiring attentiveness to his every word and gesture as he explains from a diagram spread upon the floor; when you hear his "beseechings" to remain mindful of the solemn duty devolving upon them; when he asks in tears if they will allow their country's flag to unfurl its folds and wave over oppression and despotism—and then look over your shoulder and see the bewhiskered spectators in the crowded court room bending forward with mouths agape, you grow almost hysterically apprehensive. At this moment it's all you can do to restrain your frantic self from leaning over to your counsel's ear and asking in tragic whispers, if it is too late now to plead guilty to manslaughter as a compromise. But the thought of your family deters you from it, even in your delirium, and you stoically resolve to meet your fate unconfessed!

When the travesty is over and judgment has been duly entered and your counsel leads you half dazed from the room into the open air, you turn back for another look at the Goddess of Justice in her niche above the front entrance, to

see once more her stern look and balanced scales. But lo! The balances appear to be awry, and you fancy you discern a derisive smile playing over her ashen visage. As you take the train homeward, completely subdued, you wonder if after all "discretion is not the better part of valor" and firmly resolve it is your last, as well as your first experience, at "bucking the inevitable."

The wire over the lead previously mentioned is No. 10 B.&S. gage copper wire for all circuits, so about 45 ohms, or otherwise about one-third mile standard cable equivalent was saved, due to the cutoff. One terminal of the lead is carried into the toll office through about two miles of No. 20 B.&S. gage, .10 mf. capacity cable, equivalent to about 25 miles of aerial line. At the other terminal, it is carried through one-quarter mile of No. 19, B.&S. gage, .09 mf. capacity cable, equivalent to about four miles of aerial line. In this instance, the aerial wires at both terminals could have been brought closer to the office at moderate expense, since exchange poles were available upon which to string them. The necessary distance from the aerial wires could have been cabled with more efficient cable at a cost incomparably lower than the sum spent in reducing the distance between the two cities, and have effected a higher standard of transmission at the same time.

Toll Line Wire and Insulators.

Of all the inconsistencies practiced in outside construction, using heavy copper line wire of great cost and then prejudicing it by high resistance fuses, cable, heat coils and inefficient central office equipment, is the most incongruous.

One of the most flagrant cases that has come to my attention—and I have reassured myself by making further inquiries to make certain that my first information was correct—was in a system in the East. The particular line—a typical case in that system—was 800 miles in length, being a through line. The wire in this circuit was No. 8 N.B.S. copper, 435 lbs. to the mile per conductor. In order to facilitate testing and the location of faults, the line was looped in and out of not less than 12 offices, each having four to eight fuses. It was first fused with fine wire in glass at the outside cable terminals, but these latter were changed to fuses in porcelain where the bridle wires tapped onto the line wires. These fuses at the line had a resistance of approximately four ohms each.

At the terminal rack at each test point, four fuses—one in each wire in and out—were included, having a resistance of approximately 10 ohms each. In other words there were nearly 55 ohms fuse resistance added at each of the 12 test points, not to mention the resistance of the small gauge exchange cable from the pole to the terminal rack and the resistance of the No. 22 B.&S.G. switchboard cable. Aside from this was the capacity of all cable conductors which aggregated considerable. In other words, about one-seventh of the total ohmic resistance of the circuit was fuse resistance.

A better talking circuit could have been obtained by using wire of six-sevenths such weight and section, but eliminating the fuse resistance. The ohmic resistance would have been the same in either case, though the electrostatic capacity and distributive leakage would have been slightly less in the case of the smaller wires, meaning if anything a better talking circuit. The saving in weight on this basis would have been about 99,426 pounds. At 15 cents per pound, that would mean $14,913.90 in first cost of wire only. This does not count additional cost of freight and labor and the increased weight on poles occasioned by using the larger wire. That seems like pretty high priced protection when a little ingenuity might have eliminated the series fuses at no unreasonable hazard. Incidently the fuses were continually rupturing from light strokes of lightning or from mechanical causes, and the loss of line service was considerable.

In connection with the above line was about four miles of submarine cable at one end and about 1½ miles of No. 19 B.&S.G. .10 mf. capacity exchange cable at the other end. Now, it was supposed that the effect of the submarine cable was making speech so attenuated, since it was necessary to shout to be even heard. A commercial conversation was consequently next to impossible. All time was cut from 50 per cent. to 95 per cent. Most conversations were repeated by the operators, so the patrons did not converse directly except under the most favorable conditions. A new submarine cable was ordered—specified by the general manager. He wanted three wrappings of paper to improve the dielectric strength—forgetting all about the fact that the compact core would raise the electrostatic capacity. Hence the new cable did not make an appreciable difference in the transmission.

About 10 years after the line went into operation, it occurred to someone—either the office boy or the engineer, I am not informed which—what the real trouble was. It was corrected in due time and the line now talks well. It might be mentioned that there was one ordinary 1,000-ohm tubular drop and four ordinary 1,000-ohm bells bridged on the line between the terminal stations. These were across the circuits during all conversations between terminal offices.

As a matter of fact we have many such cases with us still, though perhaps not quite so extreme. For the lines running into our largest cities near "headquarters," considerable care is used. However, this is not the case in the smaller offices or in plants under the superintendence of home-made engineers, or perhaps a general manager of the old school, who will not listen to a "smart-Aleck" engineer with his "high falutin' ideas." In the very great majority of cases, the "hello test" for transmission is all that is required. If the party at the other end can be heard fairly well, between terminals, under favorable conditions, the line is considered O. K. How this line might act when connected to some other line is not thought of. The fact that No. 10 copper wire is used and "No. 10 iron wire" efficiency is attained, is not looked into. Why borrow trouble, so long as no subscriber or patron comes up to the office to challenge the manager to a fistcuffs argument about the way he hears when using the lines, and for which he pays his good money?

The conditions referred to, do not occur in some of the older lines of engineering, where this rule-of-thumb practice and snap-judgment does not go. This rule-of-thumb-snap-judgment business goes on in the field of action, despite the diligence of the world's supply of savants monopolized in the 550 who are so preoccupied exploring the manifold mazes of Nature for her hidden secrets. (See pages 20 and 21, 1913, Annual Report of the American Telephone & Telegraph Co.) However, thanks and homage to the exclusive ingenuity of this little band, we are not still using telephones made with a string stretched between the bottom of two discarded tomato cans.

I remember one engineer who was a perfect crank on insulators and wide spacing of wires. The insulators on his leads had to be, supposedly, the very best and most costly procurable. His poles were set 40 to the mile. His transpositions were spaced from ¼ mile to two miles. He used two-piece transposition glass—meaning that the equivalent of every tenth pole was a transposition pole on the lines having ¼-mile transpositions—or that the equivalent of 10 miles of a 100-mile lead was on such glass, subject to inferior insulation. The wires, also, were strung relatively very close, over a similar equivalent distance, making for higher electrostatic capacity between pairs. This same engineer was not so particular about the size or insulation of bridle wires from the line wires to cable terminals, nor was he so particular about overhanging limbs of trees standing near the lead at the time of construction—subsequent maintenance was "up to the maintenance department."

Speaking of insulators: An insulator having extraordinary

insulating properties under laboratory conditions, may be so fragile that few, if any, arrive on the job free from damage. One type of glass insulator, largely advertised and very expensive, has a double petticoat and other patented advantages, but it is so fragile that few free from damage are received from the factory. Under line conditions, an insulator must not only withstand the mechanical strain of the line wires, but must withstand the impact of missiles thrown by boys and others. A low-priced insulator that will sustain under such abuse, is far better than a high-priced ostensibily more efficient insulator, that will not sustain in practice.

Reverting to the stringing of wires taut: In the first place, a needless strain is created on corner pins and poles. This is aside from the fact that in stretching the wire, it is common practice to strain the wires beyond the limit of elasticity, which will either cause a rupture at the time, or at a subsequent time, due perhaps to "fatigue." I had experience with a lead in which a foreman overstretched the wire in a distance of 40 miles. In a period of one year there were no less than 20 breaks in the spans to which no independent cause could be assigned. Wire in the same shipment, strung by other foremen, gave no such trouble. An "open" of this kind is the most difficult kind of line trouble to locate accurately by test methods.

In connection with stringing of wires taut, may be mentioned the practice of setting poles very close together, regardless of topographical or climatic conditions, or the ultimate number of wires and the gauge of these wires. I know of a lead built by a construction man who was a perfect crank on having the poles close and avoiding long spans. In crossing ravines and streams, in order to make the spans the shortest possible, the poles were placed near the edge of the bank. As a consequence, washing action has, in a number of cases, caused the poles to go down, taking wires with them. Unfortunately this undermining occurs at a time when it is next to impossible to get the lines up again without great loss of time, and expense incurred in sending a crew to the scene—perhaps being obliged to have them wait until the flood subsides before repairs can be made. My experience has been that, where the choice lies between a very long span, and a questionable footing for a pole—the long span is the lesser evil.

It is an unfortunate thing that the first man, who had occasion "to dead end" a pair of wires, did so by using an ordinary insulator, or two of them, by the use of a double arm. Now, because of force of the example and habit, we can't get away from it. Perhaps our sons, or our grandsons, will specify a means, that will become universal, of dead ending without the use of the usual insulator pins, and one that will obviate the twisting strain on cross arms which is now common. *(To be continued.)*

Away from the City

Some Contrasts—The Beneficiaries of War

By J. C. Kelsey

War was declared. Ministers were handed their passports. The people of Europe, after holding their breath for over 40 years, knew that the hour had struck.

Everyone began hoarding his gold. Everyone began selling everything which could realize a dollar, because every man knew that war spares neither private nor public fortune.

America was the sale market for the sale of their products. Selling became the thought of the day. The New York Stock exchange was soon affected with indigestion, and in sheer self defense shut its doors and went out of business.

The harbor become full of ships. Idle men began to be in evidence. Even at night, thousands of them could be seen watching the bulletin boards.

Banks gave 60-day notices and everyone felt that the end of the commercial world was at hand. It became difficult to borrow money, and the rate of interest arose immediately to 7 per cent. The city man began to feel that life is of few days and full of trouble.

As I write, I am in a small, yet typical Kansas community. Land is held at $150 an acre—and the town is full of retired farmers.

The town has 60 per cent. of its streets paved with brick and asphalt. The tax rate is high, and, if enforced in Chicago or New York, there would be rebellion. It is cheaper to run Chicago per capita than a well kept Kansas town.

There is no bulletin board; no crowd to watch it. Few people even comment on the war. The old soldier alone seems to be interested, comparing something to Shiloh or Gettysburg, or predicting the downfall of Emperor William.

The banks have huge deposits, and not one of them has ever taken advantage of a 60-days' notice.

Here we have the other extreme. This is a community which profits by the war. Naturally it rejoices in war—if it is among nations elsewhere.

It has something to sell to people engaged in war. It sells mules, horses, grains and feed, things that war demands.

Instead of reading war news, its eyes are glued to the market page. None here cares whether Boston or New York wins the baseball penant—or if the stock exchange opens.

All they ask is a good price for wheat, corn, hogs, and hay.

This community is in a corn country. It gets 80 cents a bushel for corn. Think of it! There was a day when corn was sold for 12 cents a bushel, and the district farms hauled it to the school house for fuel—it was cheaper than coal.

By some freak of fortune, the Kansas farmer went into wheat last fall. He is selling the banner crop of his history at $1.07 per bushel. Everything he has is worth big money, and he has no sales expense.

Naturally we ask how a telephone company fares, living in the midst of such a prosperous country.

How does the farmer feel about his telephone when he gets nearly a dollar for a bushel of corn, and sometimes $20 for a ton of hay? How does he look upon the telephone company when he gets $15 for a small calf, or some unusual price for his other products?

Well, he doesn't look with much favor. He wants telephones at 25 cents per month. He does not want to pay $1.25 per month for a telephone.

Somehow his attitude is inexplicable. Before he will pay $1.25 for a telephone, he will organize a mutual telephone company. He seems to have a natural hatred of a telephone company, simply because it is a corporation. He can't get it into his head that a telephone company is owned by stockholders—people who are his neighbors.

He simply will not pay for telephones—even if he got $2 a bushel for corn. Yet throughout all this war trouble, his telephone has been jingling overtime. The operators are worn out—they have been so busy calling for the market.

Without this telephone, the farmer could not stay at home and run his farm. He would have to stand close to the market board.

He needs the telephone. It is his most important all. In fact, the telephone has made the farmer a potent force, instead of the rural joke he once was.

When corn reaches 80 cents, do you think he will stand a raise of $3 per year? Will he pay a rate which will give the telephone man even a small profit? He will not.

Somehow the telephone is cursed with some mysterious handicap. The farmer believes that making of profits is the rule of telephone companies. He believes that $12 a year gives the telephone man a fortune.

While he would organize a rebellion, if the rates for corn, wheat, and hogs were placed at a fixed price, he insists that the telephone company adhere to it.

There was a meeting of the Farmers telephone company the other day. There were 50 men there and they came from an average distance of six miles. The teams and automobiles were lined up at the public squares.

The meeting lasted all day, too. There were many speeches —and many sharp allusions to the local telephone company which asked $1.25 per month, and which they would not pay. If the telephone company had given one wealthy farmer single line service to town for $1 a month all would have been well.

The farmer's telephone costs him $12 per year. He has paid $50. So at 6 per cent. he is paying $15 per year, or the hated $1.25 per month.

The farmer who started the Mutual company is worth $250,000. His time is worth $25 per day and even more. His heavy automobile was driven ten miles that day and it did not cost less than 20 cents per mile to run it. His meals cost him $1. Besides he smoked several cigars, and gave one or two away—being a liberal man.

During the meeting he spoke fervently of the hope of having 25-cent telephones. He roasted the local company for extortion as well as arrogance, and sat down much pleased with his efforts. Yet that very day cost him close to $30, which added to the $12 plus interest of 6 per cent. on his $50 investment, makes $45. That $45 is higher than the average charge for telephone service in Chicago, and is but $5 less than the New York charges.

This is no wild diatribe against the mutual or farm telephone. The telephone belongs to the farmer. He is in economic need of it. With him, it is no fad or extravagance. He has a right to go into the telephone business.

The local company itself went into the telephone business in protest. It objected to high rates, and it objected when the average telephone charge was close to $70 per year.

The local telephone company probably over-educated the people on the question of dollar telephones. And the farmer seems to have clung to the original theory of the telephone man, that there was a great profit in the telephone business. Somehow everything else has escaped him.

There was once a sign that bore this legend: "John White will feed you for 20 cents." And he did feed the farmer for that price. Strange to say, he made considerable money. Today, he charges 40 cents, and not a word is said that John White is overcharging anyone. Everyone knows that John White pays more for flour, meat, potatoes, and mince pie.

Strange to say, the telephone company failed to show that it pays more for flour, meat, potatoes, and mince pie. Its employes do, and the telephone company has to pay its employes more so they can meet the increased cost.

Somehow the millions of dollars spent on telephone publicity has miserably failed to reach the ultimate consumer. Surely we have a wide field of opportunity for missionary work.

I mentioned to the rich farmer that his telephone was costing him $45 a year; that his service was bad; and that worse than that, there was so much cross talk from the grounded lines that there was no secrecy. Besides there were days when the lines were down and his own men were sent to assist in restoring the service.

He met all arguments, by saying that he did not charge for his time, and he was coming to town in the automobile anyway.

Here I am in a community which is profiting by the greatest misfortune in European history. It does not seem possible that the same sun and moon looks down upon the dead and dying and the prosperously living within a few hours.

It seems unfair that one race should be in the throes of despair while another is riding on the highway of hope and realization. Does the community realize its happiness and its fortune? I am afraid not. They want more.

One of my old friends has a 50-acre farm. He put half of it into apples some years ago. He planted the whole field in alfalfa. Every year he has realized nearly $100 per acre on his place.

Two years ago an apple buyer offered him $3,000 for his apples. It was accepted. One year ago the buyer paid him $5,000. All he had to do was to haul the apples to market. This year the buyer paid him $8,000 for the apples on 20 acres.

In three years the gross earnings of this 40-acre piece of Kansas land has been $25,000. Does he have the local telephone service at $1.25 per month? No, it is too expensive. He belongs to the Mutual company, because he will not stand for the great profits of the local telephone company, demanding $1.25 per month.

He has a six-cylinder automobile. He takes long trips, touring clear back East to the home of his youth. He has a few first mortgage bonds for the rainy day. He reads the daily newspapers and is familiar with California as well as New York.

Why does he act as he does toward the telephone company? Why does the telephone seem to be alone in his conception of economy? Why does he object to paying $15 a year for his telephone, the cheapest thing he has? It is too much for me to answer.

Here is a typical newspaper item: "Mat Jones is planning a sale. He will take his mother to California in their six-cylinder Stuts, where they will spend a year before returning."

Here is another: "Emil Burky is all puffed up because he has a hired hand who owns an automobile."

And still another: "Charley Lewis is making a boulevard out of that big rock hill. He wants to go to town in 12 minutes." I find that Charley lives eight miles away and his scheduled time averages 45 miles per hour.

In spite of this evidence of a great leisure class, I find that local telephone company has but 3,000 telephones, and with it, a gross rental earning of $36,000 per year—just one dollar per month. So it seems that the local telephone company has been unable to enforce its charge of $1.25 per month.

The company has, in addition, a local toll earning, and a toll terminal earning of about $4 per telephone. This helps to overcome partially an actual operating cost of $13, and allows a partial dividend, sometimes.

It seems that a rich farming community is a poor place for profitable telephone service.

Henry Ford is the patron saint of this community. Over these hills and muddy roads, his cars seem to go when all other locomotion fails. The automobile is the farmer's aid. He pays for it cheerfully—and he makes no protest on the price of gasoline.

One says the automobile has changed the economic farm map—and this realization has made great automobile factories. But the telephone was the natural forerunner of the automobile. Without it the automobile would not be any more efficient than the old team and wagon. It is the combination of the telephone and the automobile that confers the real benefit to the farmer.

Just why the farmer appreciates his car and denies the telephone company the fruits of its birthright, no one can say. The day is fast coming when the rich farmer will be a farmer and will not try to be a grocer, butcher, or telephone man. His business training will teach him that his entrance into the telephone business is really a case of biting off his nose to spite his face.

He will be more willing to live and let live, and give the local telephone company a chance to share in the prosperity of eighty cent corn. All he will have to do is to concede an additional $3 to the telephone company and save 30 of that $45 dollars which it actually costs him today.

This is no wise a slap at mutual telephone companies. In so many ways, they were a necessity because the local company did not have the means or were slow and arbitrary in their dealings.

The only question brought up is an economic one. If the telephone company could get a living rate, it could grow and give an improved service as well as save the farmers money.

It is certainly evident that a company seriously engaged in the telephone business, can give cheaper and better service than a company which is but indirectly engaged in it. As long as hostility exists, the telephone company has a double burden. It has not only a low unremunerative rate, but suffers a loss of local investors.

No man will invest in a hostile enterprise. As it is, true telephone development is retarded and manufacturer, telephone company, and farmer suffer alike.

This condition is similar on a national scale. Our warfare has discouraged investors and we have not developed as we should. There is no reason why telephone manufacturers are not running at the same speed as automobile manufacturers. They would be working overtime the year around, if some power would weed out our various understandings.

All along the line, there has been a civil quarrel; every foot of the present progress has been hotly contested. We have stood greatly in our own light.

Those who worry about depression and hard times are in the minority. The great productive parts of the world are not worrying over closed factories. They are raising something for men and animals to eat—something to do men's work.

They do not worry over the cost of selling, nor do they have periodical fits of economy in the sales department. They do not shut down at night, for everything they have grows better while men sleep.

Why is it that the telephone is appreciated so much more in communities apart from the agricultural? Why is it that a telephone company fares better where men have little? Its very existence seems begrudged to it by the ones most able to pay.

Yet in spite of its handicaps, it is growing and gaining, and will be yet a complete part of the life of the nation. Every dog has his day, and so does every man and group of men have theirs.

The farmer is having his day now. And the day of the telephone man will yet come, in all its glory.

It is a pity that we cannot put our reserves into apples and alfalfa.

MORAL: Every man to his trade.

Automatic System in Service at Jacksonville, Fla.

The new automatic telephone system of the Home Telephone Co., at Jacksonville, Fla., is now in service. In speaking of the new service Charles Blum, president of the company, said:

"It has taken time to bring about the operation of such a telephone plant. Where a few solid substantial business men, less than 18 months ago, decided that we needed the best telephone service which could be had for Jacksonville, it seemed a tremendous task, we had before us. We had only a franchise and a franchise which required of us large expenditures of money and the making of a more efficient public service, besides the making of a Jacksonville beautiful. Our wires, on all paved streets, were to be put underground, doing away with unsightly poles and wires on the principal streets. We had only about a year in which to build. Our construction had to be sufficient to take care of the marvelous growth of Jacksonville, which meant building a plant to take care of 2,000 telephones, if necessary.

The first thing we did was to ascertain if the public desired the automatic telephone and inside of 90 days we had over 3,000 subscribers. Next we perfected an organization composed of the most efficient and practical talent in the telephone business to construct our plant.

Our organization, prior to the starting of actual construction, devoted in the neighborhood of four months in working out plans, drawings, details, specifications and estimates wherein was contained all necessary information, facts and figures to fully acquaint us with the physical layout of the proposed plant, together with the cost attendant thereon.

The next matter to be consummated was that of funding the proposed project, which has been fully cared for by Jacksonville citizens, together with citizens of Fernandina, St. Augustine and other cities in the state, and this company now starts in business under the ownership, control and management of Jacksonville people.

Under our rate, $4 a month for business, $2 a month for residences and 50 cents a month for an extension telephone, it means for only 5,000 people or subscribers, that the telephone rentals will be about $12,000 a month, or $144,000 a year. With this company, owned and managed by Jacksonville people, it means at least $120,000 a year kept here at home and not sent away. There has been no hurrah, but some solid, effective work done by those interested in our company.

The plant as conducted is of the 'all cable multiple' type. Our underground is fibre conduit enclosed in concrete, and consists of over 400,000 feet of underground construction, equal to over 70 miles of conduit. Our exchange building on Adams street, opposite the city hall, has been completed, except as to some inside office work. The equipment is installed and in operation sufficient to take care of 6,000 telephones within the next four months. Our Riverside exchange building which we found necessary to build, is nearing completion. Our subscribers now number over 4,000 and were solicited by us within the last 90 days."

The following is the personnel of the Home Telephone Co: John G. McGiffin, chairman executive committee; Charles Blum, president; J. J. Ahern, vice president; John W. Dodge, treasurer; Harry J. Wood secretary; C. L. Fisher, general manager.

The Rejuvenation of the Craneville Telephone Exchange

A Serial Story Telling How a Rundown Telephone Plant Was Rebuilt, Enlarged and Changed Successively from a Grounded to a Local Battery Metallic System and Later to Common Battery —Problems Encountered by Every Practical Telephone Man

By Paul Hamilton

Early one morning, as Mr. Barrows was engaged at his desk, a gentleman entered the office and introduced himself by laying an engraved card before the manager. The card read:

JOHN I. PERRY

GENERAL SUPERINTENDENT

ALLIED INDUSTRIES CORP'N ST. LOUIS

"Exceedingly pleased to meet you, Mr. Perry. My name is Barrows. Have a chair."

"I am glad to meet you, Mr. Barrows," returned the visitor. "I hoped I would find you in, as I wish to transact my businehs and get away on the noon train. As you see," he continued, "I am interested with the Allied Industries. You may have heard that we are building a branch here—woodpulp and fibre specialties, is our line in this section."

"I have called at the building twice and have made preliminary arrangements to install a telephone, when you are ready," said Mr. Barrows.

"Yes, the contractor told me you had been around. It was at your suggestion that he provided a duct through the concrete for your wires. I am glad you thought of that. What I came to say, is, we will not want a telephone but telephone connections with our own switchboard. We have a private board in St. Louis, which was left on our hands. It is a 30-line board of the two-wire type. I think that is the way our electrician stated it. It has seen less than a year's service and is in A No. 1 condition. I have ordered the board shipped here with the next car of material.

"I have brought with me two sets of floor plans with the locations of the board and ten stations designated. You will understand, though, that at present only seven of the stations are to be put in actual service. Here are the first and second floor plans of the main building and this is the annex, or shipping room. The floors are to be of concrete and for the most part overlaid with resilient composition. As you will see, provision was made for conduit to carry the light and power wires, but the telephone conduits were overlooked. There isn't time to bother the architect, as they are ready to lay the floors.

"The contractor has given the foreman instructions to go on with the other details and leave the floors until you can tell him him where you will want your outlets. The laying of conduits in the unfinished floors is a matter of but a day or so, as the electricians are still on the job. If it is possible for you to give this your early attention, it will help us along considerably."

It had been such a long time since Mr. Barrows had had a proposition put to him in such a direct business-like manner, that he was, for the moment, at a loss for words.

"I will add," Mr. Perry went on, "that after you have fixed upon the necessary plans at the factory, I wish you would draw up a contract for the service I have designated. It is understood, of course, that your company is to furnish the instruments and necessary material; everything in fact, except the board."

"I presume there are no batteries in connection with the board?"

"No. It will be necessary for you to supply them. There were seven or eight small jars; but no care was taken of them. I think I have given you the necessary details, so that you can go ahead. I assume, of course, that your rates will be within reason.

"We make a very thorough use of inter-department service, as we call it. We find our foremen can transact a greater part of their business by telephone instead of wasting time in going from one department to another innumerable times each day. I presume our local service will not be very heavy. Well, I have taken up enough of your time and am pleased to leave the matter in your hands for the present," and Mr. Perry left almost as abruptly as he had entered.

Mr. Barrows examined the blue prints and found several additional details in penciled footnotes. Among them was one stating that all instruments were to be portable or "desk" equipment. Three sets were to be equipped with transmitter cut-out buttons and one station with an eight-inch extension bell for night service. The floor plans as drawn were as shown in Fig. 144.

As soon as he could get into communication with the Doctor, Mr. Barrows arranged to meet him at the new factory. Eventually such work, that is, that of planning and laying out special jobs, would preferably fall to Forster, as he would be more active in the management than either Frank or Germany. He was also the only one capable of making up an estimate of the cost of such an installation.

Together they went over the ground, made the necessary notes and returned to the office, when the Doctor made the proper alterations and additions upon the floor plans provided.

Before drawing up a contract, the manager called Mr. Rankin into conference and discussed the matter. They decided upon the following schedule of rates, which was duly submitted to Mr. Perry:

Trunk lines to P. B. X.	$36 per year
Stations in connection with P. B. X., less than five, per station	10 per year
As above, five or more, but less than 10, per station	9 per year
As above, 10 or more, per station	6 per year
Extension telephones: Same rate as main station to which connected.	
Extension bells	4 per year
Extension gongs not to exceed eight inches	5 per year
Maintenance of switchboard, subscriber's property	18 per year

Mr. Barrows explained each item to the prospective owners.

"The trunk lines," he said, "represent business telephone lines with us. It is customary in many places to make a higher rate for trunk lines; that is, lines terminating on a branch exchange board, on account of their multiple use, so to speak, from several instruments. It is an established fact that, in

larger places, their use, that is, the number of calls over a line so arranged, exceeds the number made over a direct line terminating on a single instrument.

"Here in Craneville, however, it is not probable that will be the case. I dare say O'Malley's lines are used a great deal more than will the proposed trunk lines. Then, again, the general practice is for the telephone companies to supply the switchboard and, in a majority of cases, no rental or maintenance charge is made. This expense must be covered by the rental of trunk lines and instruments connected to the switchboard.

"I believe it is also considered that the equipment in the board required for a trunk line or terminal is considered a part of the trunk or terminal to which it is connected. I do not question the correctness of this theory in general. In that case, the switchboard proper would consist only of the cabinet, cords and keys, the operator's set and the batteries.

"As we will not own any of these parts, except the batteries, we can readily draw a line for a division of our maintenance charges like this (Fig. 145). Again we are justified, I think, in making a maintenance charge for the P. B. X. on account of the equipment being special and requiring special requisitions in each case. I have written a clause in the contract covering cost of replacements, but have not included the cost of making repairs upon any part or piece in which the work is done by us. That is, if we replace a cord, we will bill the subscriber for the cord only, the work of replacement being covered by the contract. If we repair the old cord and later replace it in service, it is at our expense, presumably covered by the rental charge. This applies to relays and other equipment.

"I advise the Doctor to keep a separate account to ascertain if the rate fixed upon is sufficient to cover the expense incurred, or if it is excessive. These rates may be readjusted at the end of a year. If you have your figures to show, I think you will experience little difficulty in making an adjustment, as the readjustment clause was inserted by Mr. Perry. This firm has had wide experience and I think you will find that perfect fairness on your part will result to your advantage.

"Mr. Perry writes that, while the rates submitted do not quite meet with his idea of what they should be, he is anxious to place the matter upon a footing so that we can go on with the installation. He explains that their first year in Craneville is on the experimental basis and the charges of various items of cost will not be analyzed in detail until that period has passed. If it is necessary then to shade a little here and there, the telephone rentals may be called into the equation.

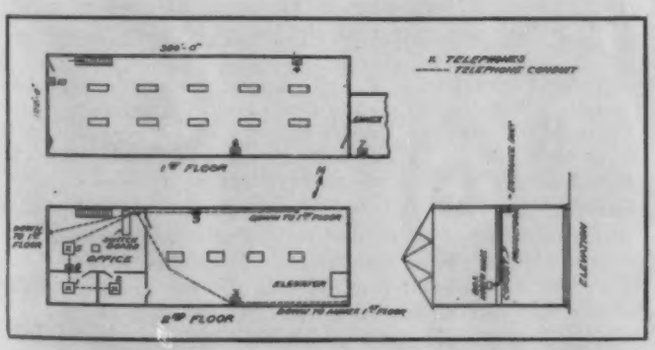


Fig. 144. Floor Plans of Allied Industries' Factory.

Hence you should be prepared to deal with him when the time comes.

"How hard should we push this branch board business?" Mr. Rankin inquired. "And what advantages do we get? It looks to me as if the scheme is entirely to the subscriber's advantage."

"Like other things, we have to consider each individual case. In some cases, take O'Malley's store for instance, another telephone would be a nuisance to us and him as well, for several reasons. He is getting to do a big business and his store covers a lot of floor space. His customers call very frequently for a certain person to take their orders. While

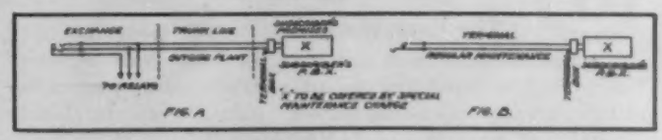


Fig. 145. Diagram to Illustrate Division of Charges.

search for him is being made and he is coming to the telephone, the line is tied up."

"Well, that looks to me like O'Malley's business and not ours."

"It is primarily, but at the same time it reflects upon our service. The calling subscriber often sees no further than our exchange, and complains to us. We tell him we cannot overcome Mr. O'Malley's faults in answering. Mr. O'Malley tells him it's up to the telephone operators, and there you are.

"Another fact in which we are interested is that, while the connection is up, the operator must give it special attention, knowing that a complaint is quite likely to result. Her other work may suffer as a consequence. It is such a simple matter for a subscriber to become impatient and flash the operator that, with a common battery system, the occasions of operators to go in on connections are greatly increased over the magneto system. To sum up the question, a branch exchange helps to expedite business and in that way is advantageous to all concerned.

"As I figure this Allied Industries' contract, it will cost them about $168 per year. That looks like a money making proposition for us."

"I don't think it will be a losing one, but it will be a part of the Doctor's job to find out the facts. The maintenance of the instruments will be higher. In the first place, they are to be portable sets—that is, the receiver and transmitter are mounted upon a portable stand and connected to the signal by a flexible cord. I will explain that carefully to the boys. Of course, such equipment is subjected to harder usage than where the instrument is compact and attached permanently to a wall."

"I suppose everybody will want that kind of telephone; they'll claim they are better," Mr. Rankin observed.

"It will, no doubt, create some demand. As you have suggested, some subscribers will claim they give better service. In the equipment there is absolutely no difference. There is, however, a certain advantage in talking while seated at a desk or table, which makes it appear to the user that the transmission is better. I do not believe I would discourage the installation of desk sets. Calls obtain more prompt attention from the subscriber, as the instrument is at his elbow. Then, again, it may increase the number of calls slightly, but to offset that his calling will be more deliberate and evenly divided, Instead of allowing a lot of telephone business to accumulate until he happened to go to the telephone, he will clean up each item from his desk as the papers pass under his hand for consideration."

"About operating the Allied board: I suppose we can spare Kitty to go down there," said Mr. Rankin, with a twinkle in his eye which Mr. Barrows alone observed.

"They haven't said whether they want us to furnish an operator or not. Of course, you understand they operate the board at their own expense. I guess we will leave that detail for the Doctor to settle," Mr. Barrows replied. "He will know, without a doubt, if Miss De Land can be spared from here."

"By the way," he continued, "whoever they employ, I would suggest your asking that she spend a few days in the exchange here and become familiar with our methods. It will help to keep the service smooth and free from complaints."

"Well, I guess I'll mosey along to the barn," and Mr. Rankin departed. *(To be continued.)*

The European Patent Situation.

The condition of war in which the various countries of Europe are involved has caused a good deal of uncertainty in this country as to the present state of patents already granted and applications filed or to be filed in those countries. Patent attorneys naturally have taken such steps as they could to protect their client's interests abroad. Some interesting information as to patent relations with European countries has been furnished to TELEPHONY by Edward E. Clement, attorney and counsellor at law and solicitor of patents, McLachlen Building, Washington, D. C.

At a recent conference with the solicitor of the state department, and with the commissioner of patents, Mr. Clement suggested that our government establish a temporary division in the patent office in Washington, where inventors and attorneys may deposit fees and papers intended for the patent offices of the nations at war. It was thought that this plan would be favored by the diplomatic representatives of the waring nations and if adopted would be of estimable benefit to Americans having patent interests abroad. They could thereby establish a date and prove a declaration of their intention to file, pay fees, etc., within the time required by law in the respective countries.

Under the international convention it has been the custom to file applications in the principal foreign countries, and obtain certain advantages, provided such applications were filed within a limited period of time from the first filing in the United States. Communications have been so disturbed by war conditions, especially with Germany and Austria, that unless some means is found to deposit the fees and declare intention, during the period fixed by the convention, and have this accepted after the termination of the war, irreparable damage will in many cases result.

Mr. Clement states that it has long been the custom in his office to prepare all papers in foreign cases the same as in domestic. This explicitness is found to be of special importance now because most of the foreign agents and attorneys have had their organizations sadly depleted by the several calls to the colors. Where action is taken promptly the interests of patentees may be cared for without risk.

The following schedule has been prepared by Mr. Clement showing the European patent procedure during the war.

EUROPEAN PATENT PROCEDURE DURING WAR.

Great Britain: No delay is occurring in the filing of applications for patents in Great Britain, and in the payment of taxes, or in carrying through other matters relating to patents, trade marks or designs in Great Britain. Mail goes and comes direct.

France: I have been unofficially advised that notice has been issued by the French government extending indefinately the time for paying taxes on French patents, and also providing for the filing after publication for patents, which in the ordinary way would result in the grant of invalid patents.

The time for effecting working of patents is also extended in France indefinitely in the notice referred to.

The mails to and from France are direct and also by way of London.

Belgium: I am informed that the removal of the seat of government from Brussels to Antwerp has not entirely suspended the operations of the patent office, and we have direct mail service.

The Belgian law provides a generous period for paying taxes after their due dates, but it is more than likely that additional extensions will be granted for taking care of patents that become due for renewal while the war is on, and with regard to the filing of applications, the Belgian law provides for the grant of valid patents after publication elsewhere. The ambassador for Belgium in Washington may, however, accept renewal fees, and no difficulty will be experienced in maintaining patents in that country.

Germany: I have been unofficially advised that a three months' extension for effecting amendments on all German applications has been granted. Presumably this extension will apply to the payment of taxes, filing of appeals, and other matters connected with the prosecution and upkeep of patents, designs and trade marks in Germany.

The German imperial consulates may be ordered to receive and give receipts for fees and taxes on German patents. Such payment of fees to him will then be equivalent to payment direct to the German patent office. Mails are by way of Denmark and Italy.

Austria-Hungary: A moratorium has, I understand, been passed by the Austrian government, under which taxes can be paid after their due date, but the period for which the moratorium is to extend has not yet been communicated to me. The mails are the same as for Germany.

Sweden: The moratorium passed on August 5 by the government of Sweden extends the time for one month wherein to effect payment of renewal fees, and presumably will also extend the time for the filing of new applications in Sweden, but as to this I have not yet had advices from my agents. One month's extension for paying taxes due after August 5 is, I understand, provided for in the moratorium. The mails are direct and via England.

Russia: Some considerable delay arises in communicating with Russia, and I have not so far been advised of any relief measures that have been issued by the Russian government. Doubtless proper extensions will be granted for paying taxes, and to prevent any prejudicial result arising from the publication of inventions which might affect the grant of valid patents in Russia.

Efforts are being made through the ambassadors of the different countries at war to provide here for the payment of taxes, and the filing of applications, but such arrangements will be unnecessary if long extensions are granted by the various countries now involved in the war.

Where money has to be transmitted abroad, the cost of paying taxes, etc., will be somewhat increased owing to the war taxes and high rate of exchange at present ruling. About 20 per cent., for example, has to be added to German fees.

Neutral countries: In all neutral countries, including Sweden, Norway, Holland, Denmark, Switzerland, Spain, Portugal, Greece, the Balkan States and Turkey, procedure is as heretofore. This applies also to the South American and Asiatic countries which have patent systems; also to Canada, Australia and British possession generally with which our United State mail service is uninterrupted.

The United States department of state is now working with the commissioner of patents for the purpose of devising the best means to protect American inventors and patentees in the countries affected by the war. No decision has yet been reached and no action has been taken in regard to the saving of rights under the international convention. The safest course for those who wish to preserve their dates of filing abroad, is to have their papers in the mails so that they would arrive timely under ordinary circumstances, for filing in the respective countries within one year from their filing dates here. Where this is not done, no special privilege can be claimed.

Proceedings Before Commissions, Courts and Councils

Discussions and Rulings of State Bodies Having Supervision of Telephone Companies, Decisions of Courts in Matters Affecting Public Relations of Utilities and Actions of City Councils Bearing Upon Franchises, Rates and Service

To Tax Telephone Messages.

A report from Washington under date of September 16 states that the house ways and means committee began the preparation of a new war revenue bill the provisions of which will include a tax of one cent on every telephone message on which a charge of 15 cents or more is imposed.

Physical Connection Effected at La Crosse, Wis.

Physical connection between the toll lines of the La Crosse Telephone Co. and those of the Wisconsin Telephone Co. has been effected. Subscribers of either may call their central, and request connection on long distance with subscribers of the other. If the call is made from La Crosse to a point within 50 miles of La Crosse, an additional charge of five cents is permitted; if the call is over 50 miles but within 100 miles the company is allowed to charge 10 cents per call; and for calls over 100 miles a charge of 15 cents is allowed.

Frank Winter, a La Crosse attorney who brought the matter before the Wisconsin Railroad Commission which resulted in the foregoing order, has announced that he intends to press his case for local connection between the two systems.

Iowa Telephone Co. Loses Case.

Judge Charles A. Dudley of the district court at Des Moines has handed down a decision holding that the Iowa Telephone Co. must secure a franchise from the city of Des Moines under the 25-year franchise law or vacate the streets. A brief analysis of the case as given by Judge Dudley is as follows:

"In 1873 the legislature passed a law giving corporations the right to construct lines. Subsequently this act was amended and the word 'telephone' inserted.

A few years later a suit was instituted by one Chamberlain of Des Moines, testing the right of telephone companies to run its wires and poles through the city. The legislature having given telephone companies the right to use the public highways the court held that a city street was the same as a road, and therefore ruled against the plaintiff.

In 1897, the legislature passed a section known as No. 776, which authorized regulations as to electric wires. Section 776, enacted the same year, virtually provided that all telephone companies thereafter organized must obtain a franchise from the city in which they operate.

Lawers for the telephone company argued that these sections, being subsequent to section 1324 of the code of 1872, had no effect on its right to operate without a franchise because of the rights granted by the old statute.

The question then arose as to whether the rights of the company under the law of 1873 would be impaired in the event that they were forced to obtain a franchise. The court stated that the presence on the statute books of section 1891, in which the legislature reserves the power to amend articles of incorporation of corporations and impose new conditions necessary for public good, permits the city to force the telephone company to secure a franchise and that such action would not constitute an impairment of the rights of the company under section 1324 of the code of 1873."

Following the decision of Judge Dudley, attorneys for the telephone company announced that they either will amend the company's answer in the case or will appeal from the decision of Judge Dudley to the Iowa supreme court. In either case, the attorneys for the company expect to continue their fight to the United States supreme court if necessary. In case the company amends its answer it will file another demurrer in the district court.

In commenting upon the proposed appeal of the company Mayor Hanna stated that he expected the city to win and that pending the final decision the tax imposed by the city will be accumulating and must some day be paid by the telephone company.

Virginia Commission Given Authority Over Telephones.

Senate bill No. 56 recently passed by the Virginia legislature provides for the supervision and control of telephone and other public utilities by the state corporation commission. An analysis of the bill as made by J. L. Swayze, general attorney of the New York Telephone Co., is as follows:

Section 1 gives the commission power to supervise, regulate and control all telephone companies in the state in all matters relating to the performance of their public duties and to correct abuses thereunder. The commission may fix the rates, require the telephone companies to provide and maintain reasonable facilities, etc.

Section 2 gives the commission power to regulate the division of charges, etc., between companies, the manner of transmission of messages over their respective lines or the physical connection of such lines.

Section 3 gives the commission power to hear complaints upon rates, etc., established by municipal ordinance, and provides that if it finds the complaint well founded it shall prescribe reasonable rates, etc.

Section 4 gives the commission power to make requirements, rules and regulations to promote efficiency of the service, and to require physical connection between two lines, having due regard to the interests of the companies to be affected, etc. The commission may prohibit all paralleling of the lines of one company by those of another if the efficiency of the service or the public convenience will be seriously affected thereby.

Section 5 provides that the reasonableness, justice and validity of any rate, charge, rule, regulation or requirement of the commission shall not be questioned in any suit in the courts of the state against any telephone company, and that in the courts they shall be conclusively presumed to be reasonable, just and valid.

Section 6 provides penalties for refusing to make reports or refusal to obey orders of the commission, etc.

Federal Court Decrees at Portland.

Through two decrees of the federal district court at Portland the merger of the Pacific and Home telephone systems was approved, and the sales of the long distance lines of the Interstate Telephone Co., Ltd., held by Bell interests, to the Interstate Utilities Co., confirmed. The last mentioned company is a new corporation organized to engage in the telephone business in Spokane and vicinity. It was organized by Philip Hamlin, of Denver, who is president, and Edward T. Coman, president of the Exchange National Bank, of Spokane, who is vice-president and treasurer. Austin L. Hatch, of Denver, is secretary and J. H. Morgan, of El Paso, Texas, will be general manager. President Hamlin is stated to have

said that the consideration for the purchase of the Interstate company was $400,000, that there will be no changes other than ownership, and that the new company has no connection with either the Home or Pacific companies, but will give Interstate patrons full connection with the exchanges of either. The company is looking for new quarters and will at once commence business in Spokane and the surrounding territory.

Corporation Counsel H. M. Stephens attended the Portland hearing in the interests of the city of Spokane and saw that the merger was carried out in accordance with the city's recent agreement with the Pacific Telephone & Telegraph Co. The city endeavored to have included in the decree a provision for the protection of future Independent companies entering Spokane, but the court would not allow this on the ground that it opened up a new matter. It is announced that all Independent companies now in the field are protected sufficiently by contracts made directly with the Interstate company.

At the city hall, doubt has arisen whether the referendum petition being circulated against the new franchise of the Pacific Telephone & Telegraph Co. by the public ownership league, may legally be submitted to a vote of the people even though the necessary number of signatures are secured and the city commissioners are agreeable to its submission. Preliminary examinations of the decisions of the supreme court show at least three decisions which are to the effect that the franchise voting power is a legislative act resting solely with the mayor and city council and not subject to the operation of the initiative and referendum. Though the cases referred to deal with the franchises of street railway companies their wording is such that it may be made to cover all utility franchises. The matter is being further investigated by the city counsel.

Ask Postponement of Consolidation in Los Angeles.

In reference to a petition of the Socialist party for a consolidation of the systems of the Pacific Telephone & Telegraph Co. and the Home Telephone & Telegraph Co. in Los Angeles, the board of public utilities of that city has suggested that the consolidation take place two years hence when the franchise of the Pacific company expires.

The board states that on June 30 the Home company had 56,050 telephones installed and the Pacific company 65,159. The two systems, it is declared, involve only a fraction of the duplication which the public imagines to exist. Of the residence telephones 3.44 per cent. are duplicates while 22.5 of the business stations have both telephones. Many that have both telephones require a number of telephones to transact their business and would not reduce the number if one system were installed.

Consolidation at Crawfordsville, Ind.

The Central Union Telephone Co., which acquired the automatic system at Crawfordsville, Ind., left to a vote of the subscribers the question as to which service should be retained. Three fourths of the subscribers decided in favor of the automatic and the old Bell service has therefore been cut over to the automatic.

Toll Connection Terms Fixed by Dominion Board.

An important decision has just been handed down by the Dominion Board of Railway Commissioners, of Canada, determining the meaning of "compensation" in the matter of agreements for connection between the Bell Telephone Co. of Canada and competing companies. Some 19 companies were applying to the board and the order is in answer to that application, but its scope extends to all companies in Canada.

The representatives of the companies directly interested in the application were seeking an order of the Board fixing the terms for long distance connection between the Bell and competing companies. The original application concerned both non-competing and competing companies but the case as it touched the former was settled, the Bell's representatives saying that they had no objection to such an order.

The judgment turns on the interpretation of the word compensation in the clause, "upon such terms as to compensation as the Board deems just and expedient."

The representatives of the Independent competing companies did not approve of the judgment as given, and authorized application to be made to the Board to allow their side of the case to be heard, as there had been no arguments as to what was the meaning of the term "compensation," this question entering largely into the judgment, and not having been supported either by evidence or by argument when the case was being heard.

The Board's decision was not concerned with any loss or physical injury or interference through connection. "There is no question," the order says, "that the word 'compensation' is used in quite a wide significance, embracing not only payment for service, but also compensation for loss." The board holds that it has wide discretion as to the factors to be considered in striking the rate or amount of compensation, including consideration not only of the services rendered or affected in switching, but also the effect of such connection upon the local service of the Bell company.

The board therefore fixed the payments upon the basis:

First, that there should be payment by way of compensation for loss of the Bell company, as well as considering the factor of convenience to the Independent subscriber.

Second, that there should be payment for services in connection with the additional facility given.

The main objection of the Independent companies is to the first of these provisions.

Meeting of Texas Independent Telephone Association.

The meeting of the Texas Independent Telephone Association will be held at Waco, Texas, on September 28 and 29 at the Riggins Hotel.

Summary of State Commission Hearings and Rulings.

CALIFORNIA.

Order authorizing the Bay Cities Home Telephone Co. to transfer its franchise, granted by the town of Berkeley, to the Pacific Telephone & Telegraph Co., and granting the latter company a certificate of convenience and necessity to operate under the franchise.

ILLINOIS.

September 11: London Mills Telephone exchange, at London Mills, Ill., given permission to change rates, increasing rate for rural service.

MISSOURI.

August 10: Permission granted E. W. Jones to sell John Boatright and others the Schell City Telephone Exchange, at Schell City, Mo., for $10,000.

September 9, 10, 11: Hearings held at Jefferson City, Mo., in the case of the Southwestern Telegraph & Telephone Co., of St. Louis, Mo., for permission to increase rates in St. Louis. Testimony was introduced by experts for the telephone company as to the costs of the plant and of its operation. Experts for the commission explained costs as determined by them and their summaries. Further hearing will be held at a date to be decided later.

September 30: Further hearing will be held in Jefferson City, Mo., in the case of B. Simms and others against the Columbia Telephone Co., of Columbia, Mo. At a hearing recently held experts for the commission explained the report made by them and Col. J. A. Hudson, president of the company, also gave his testimony.

NEW YORK.

September 22: Hearing to be held in New York City respecting the metropolitan rates and appraisal of the property of the New York Telephone Co.

OREGON.

September 7: Order refusing the Home Telephone & Telegraph Co. a rehearing as to rates, at Medford, Jacksonville, Gold Hill and Rogue River.

A Visit to the Independent Exchange, Ashland, Ohio

The Star Telephone Co. Operates Well Built, Equipped and Maintained Plant—Arrangement of Various Departments—Operating Room Attractively Located—Some of Its Features—Chief Operator's Equipment for Supervision of Operators and Service

By E. I. Pratt

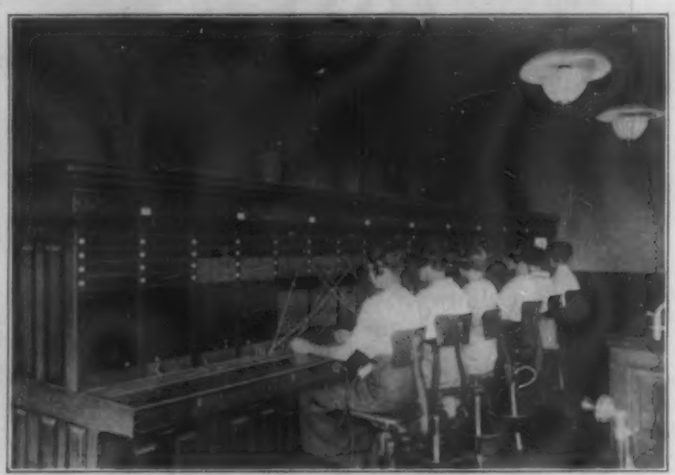
Stepping off the big interurban as the car slowed down on a main street of the thriving town of Ashland, Ohio, I asked the first passerby: "Where is the Ashland telephone exchange?

"One block this way on Main Street," the stranger pointed, "and one block to your left. It is the corner building. You can't miss it, as there is an Independent telephone shield over the door."

As I thanked the man and walked away, I wondered if his courteous, even enthusiastic reply, were not, indeed, an indication of the standing, among its subscribers, of this telephone company. The towns are many where it is necessary to finally drag out the information by several requests of passing citizens. They often seem to have no intimation as to the center of activity of one of their most important business institutions.

The Ashland exchange is located in a substantial brick building in a convenient part of the city. In the absence of Howard Schwartz, manager of the Star Telephone Co., Henry George, the wire chief, showed me through the exchange. On the first floor opening on the corner, is the cashier's and bookkeeper's department, directly back of which is the directors' assembly room, a rather unique arrangement. On the second floor, compactly, yet practically laid out, are the operating and terminal rooms. The switchboard faces the south in the corner room. This room overlooks the city park and is an altogether attractive place in which to work. Across the hall is the operators' rest rooms, and directly back of the switchboard is the terminal room where Mr. George, the wire chief, holds forth.

A convenient arrangement is a window opening on the supervisor's desk and convenient to the chief operator, through which they can obtain assistance and information from the wire chief direct. Mr. Schwartz has a unique installation and trouble record book, on the loose leaf order that is altogether the most practical the writer has seen for this size of exchange.



View of Switchboard at Ashland, Ohio.

The exchange is modern in every detail. The switchboard is two-wire type, Kellogg automatic recall. There are positions for nine operators. The board is at the present time equipped for 1,800 lines and has an ultimate capacity of 2,400

Exchange Building of the Star Telephone Co., Ashland, Ohio—Behind the Switchboard, Note the Swinging Relay Racks.

lines. The woodwork is of handsome, Flemish finished, heavy quarter-sawed oak.

The equipment, in the face of the board, is so arranged that one operator, during the dull period of the day, can take care of the calls that come in at positions quite removed

The Toll Section is Conveniently Situated.

from the position at which she is located. This is accomplished by multiple jacks placed in every panel, there being three panels in front of each operator.

For the chief operator, who is also the "Information Bureau," there is one of the latest type sanitary desks. Ample space beneath the desk assures, as the name implies, greater cleanliness and freedom from dust. There is a tier of drawers at the right end of the desk. One panel for equipment is mounted on top. It is provided with pigeon holes and book stalls for the operator's convenience.

There are no cords to bother with—everything is handled by keys. This arrangement for the chief operator possesses many advantages over older types. For instance, the operator has one key for each position, listening in secretly, on the wire. To talk to the operator at the board, she turns this same key in the opposite direction. There is another type of key for observing service conditions such as frequent complaints from one subscriber regarding service. The chief operator is connected with this party's line so that every time the receiver is taken down, she is on the line and can take

Henry George, the Wire Chief at His Desk.

note of what is wrong. The desk has a Flemish oak finish, to match the switchboard.

The wire chief's desk is of the same design and of the same material as the chief operator's desk, all circuits operating by means of keys instead of cords.

The terminal room is also "Kellogg equipped," including complete ringing equipment.

Great care has been exercised in the purchase of the switchboard of the Star Telephone Co. It is said that every bit of material which has gone into its make-up, has been of the best quality obtainable for the conditions under which it is used. Mr. Schwartz, the manager, in 1912 and 1913, planned a new switchboard equipment that would serve the city of Ashland in a most economical and efficient manner, with plenty of room for growth. After a long and careful investigation based on the performance of installed switchboards of similar size and under like conditions, a Kellogg board with complete exchange equipment was installed.

This company maintains both the Independent and Bell long distance connections. A trip of inspection around town makes evident the excellent cable work and line construction. Everything about this exchange, in fact, is kept in apple pie order and nothing is obsolete.

Urge Cent-a-Call Service for Chicago.

The Penny Phone League of 65 W. Monroe Street, Chicago, is sending out a circular showing why the proposed acquisition of the automatic system by the Bell interests should be prevented. A history of the establishment of automatic service in Chicago is presented and attention

Chief Operator at Work—Toll Board at Right.

called to the existing opportunity for the city to take over and operate the automatic service. It is declared that a telephone can be placed in every home at one cent a call. Diagrams and illustrations are presented for the purpose of showing and comparing the manner in which calls are put through by the automatic and manual systems. The Penny Phone League holds public meetings on the second and fourth Wednesdays of each month at 8 p. m.

New Organization Works for Penny a Call.

An incorporated organization, known as The Telephone & Telegraph Forum, has been organized in New York, the object of which "is to cause reasonable telephone and telegraph rates in New York and elsewhere." John D. Gluck, the chief organizer, declares that the telephone company can make money at a penny a call in each borough.

Sergius P. Grace With New York Commission.

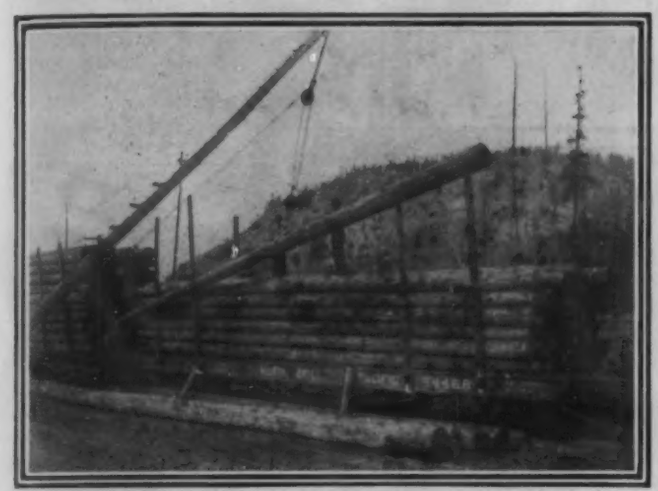
Sergius P. Grace, for more than 10 years chief engineer of the Central District Telephone Co. in Pittsburgh, and who since 1913 has done general consulting work in New York, has been appointed assistant chief engineer of the New York Public Service Commission in the investigation and appraisal of the property of the New York Telephone Co. Mr. Grace is a past president of the Engineers' Society of Western Pennsylvania.

From Factory and Salesroom

Convention: Texas Independent Telephone Association, Waco, Texas, September 28, 29, 1914

An Idaho Western Cedar Pole Yard.

The accompanying illustrations from photographs taken at Dorite, near Cabinet, Idaho, show portions of the extensive stock of cedar posts, poles and piling owned by Dennis Burke & Co. at that point. This company has yards in Idaho, Washington and Montana and has been engaged for many years, not as a wholesale concern, but as manufacturer and producer of western red cedar poles and posts. The men connected with this company are well acquainted with the pole business and the company takes great pride in the quality of its stock, in the attention given to the preparation of its product, and in its reputation for prompt shipment. The yards of the company are located on several transcontinental railroads and the ample shipping facilities, it is declared, enable shipment to be made without delay at the most satisfactory rates to all destinations.



Loading 40-ft. Sound Cedar Poles for Shipment.

The company states that its present stock is decreasing on account of shipments being made, yet one of the accompanying illustrations shows some 10,000 pieces running in length from 18 ft. of 4-in. diameter, up to 80-ft. 8-in. cedar poles. All the stocks are green seasoned material, the seasoning being thorough, and are winter and fall cut, or peeled, and graded to the Western Cedar Men's Association rules. The poles are large and straight with sound butts, with tops up to specifications and above.

One of the accompanying illustrations shows several cars of large 40-ft. cedar poles being loaded and bonded for shipment to a large eastern concern. This material was green seasoned, cut from the company's own land by its own crews. There was not a rotten butt in the shipment. Another illustration shows a crew of men sorting, grading and decking stock. This view shows a part of several acres of decked poles in the yard and gives an indication of the good quality of the poles. The pile of poles to the left in this picture is declared to be a lot of 8-in. to 9-in. 85-ft. poles. A third illustration shows what is declared to be a poor grade of stock, from which shipments are not made except upon special request, but which nevertheless shows the soundness and straightness of the company's cedar poles.

Crew at Dorite, Idaho, Grading, Sorting and Decking Poles—Straightness and Soundness of Secondary Stock.

The New Type Smith-Chicago Mixer.

The great difficulty that has confronted the designers of all non-tilting concrete mixing machines has been that of providing a machine which would mix well, discharge well and at the same time not splash. In the attempt to accomplish this compromises have had to be made in construction that have in some measure reduced the efficiency of the machine. For example, it has been considered impossible to project the discharge chute very far into any non-tilting mixer. It is necessary to move the batch over towards the discharge side. The first compromise in all non-tilting machines occurs here, as the mixing efficiency of the drum is materially affected. The ideal mixing action calls for a reciprocal sidewise movement of the batch, just as long one way as the other. If, in order to secure a fast discharge the batch is heaped to the discharge end, it becomes impossible to prevent the machine from splashing. This involves another compromise, the speed of discharge having to be sacrificed to prevent splashing.

These compromises were found to be present in the favorably known and economical old Ransome type Chicago mixer, formerly sold by the Chicago Concrete Machinery Co.; but this machine, which is now sold direct by The T. L. Smith Co., Milwaukee, Wis., has been redesigned and a new model Smith-Chicago mixer has been built after a careful survey of

the situation. The new machine is held to be a triumph in the perfection of the non-tilting type of machine and it is declared that all of the compromises referred to have been avoided.

An important feature of the design is the very long and exceeding steep discharge chute which projects two-thirds of the way through the drum. The length and steep angle of the chute are made possible by the concave face of the drum. With this chute it has been possible to locate the blades centrally, with equal angularity on both sides. The blades are scoop-shaped with high converging sides, so that the batch is poured to the center of the drum. The action of the blades, combined with the action of the drum itself produces an action of the mass which, it is said, distributes the load evenly and effects a theoretically correct and efficient mix without splashing. At the same time the chute is long and steep enough to discharge the entire contents of the batch in from 15 to 20 seconds. In a timing test it is stated that a batch of 17¾ ft. of concrete was discharged complete in 14 seconds, which is fast time for a non-tilting mixer.

In the drum of the Smith-Chicago mixer there are no moving or movable parts which come in contact with the mix and thus the distructive action of wet cement on rollers and gears is avoided. A centrally located ring encircling the middle of the drum combines main driving gear and main roller tracks in one solid substantial casting, insuring an alignment of parts. The overhanging drum heads act as a shield for the main rollers, protecting them from dirt or other foreign matter.

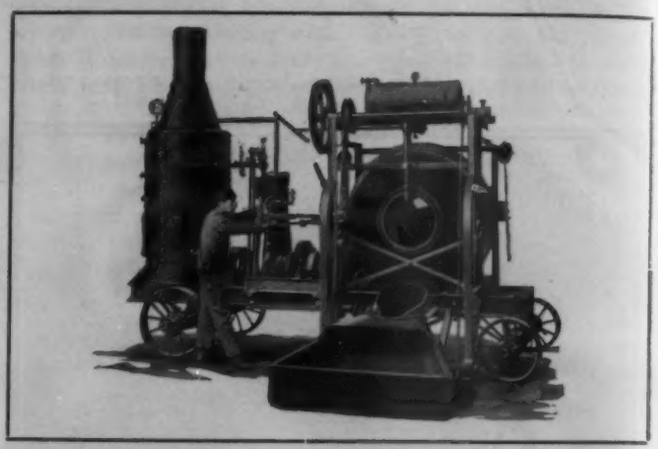
With the discharge chute used on this machine it is said that all or any portion of the batch can be emptied, and small quantities of concrete can be measured out with accuracy. The chute is pivoted above the discharge opening, and when not in discharging position, it swings out and upward, draining back into the drum and not on the ground. The spout does not interfere with wheelbarrows or hoisting bucket. On self loading machines the discharge spout can be operated from the feed side of the machine as well as from the discharge side. In connection with the Smith-Chicago mixer there is used a vertical acting power charger, which it is declared, operates quickly and easily.

In case of its being found desirable to operate a mixer mounted at a considerable elevation, the problem of loading the mixer can be readily solved by extending the guide channels

Smith-Chicago Mixer, With Power Charger.

of the power charger down any distance, not exceeding 15 feet, and using the power charger as a material elevator. This requires no extra power, as the mixer drum is emptied before the skip starts upward.

The Smith-Chicago mixer can be equipped for either steam, gasoline or electric power. The accompanying illustrations show the Smith-Chicago mixer on steel trucks equipped with steam engine and power charger. One view shows the vertical position of the skip when raised and in the discharging position. The mixer known as the Smith-Chicago special has a gasoline engine, housed. This machine is held to be the fastest, safest and most economical mixer. It is light and



Operating Discharge Chute From Feed Side of Mixer.

portable and can be easily moved from place to place. Its capacity is three feet of mixed concrete per batch, or five cubic yards per hour. The machine is carried on a Z-bar steel truck, has centrally located drumming, steel engine house, low down power charger and is compact in form.

Leeds and Northrup Fault Finder.

The Leeds & Northrup fault finder is made the subject of a carefully prepared catalogue issued by the Leeds & Northrup Co., 4901 Stenton Avenue, Philadelphia, Pa., maker of electrical measuring instruments. This is designated Catalogue 54. Drawings are presented showing the proper connections and switch settings for measuring conductor resistance; also diagrams showing four methods of fault location with this instrument; diagrams showing the method of locating opens in wire and cables, and a diagram showing the method of determining the length of bad wire where the broken wire and good wire are not in the same cable, etc. The company's type S dial decade portable, and plug decade portable, testing sets are also illustrated.

Gar-Facts, A New Publication.

The first issue of a new publication, which is a splendid example of what a live, cordial, friend-making house organ ought to be, has just been issued by The Garford Mfg. Co., of Elyria, Ohio. It is called "Gar-Facts" and is introduced with "Hello—Everybody—Hello." Judging from the first number Gar-Facts is going to be an indispensable factor in the education and entertainment of every Independent telephone optimist, and admirer of good equipment.

Paragraphs.

The Leeds & Northrup Co., 4901 Stenton Avenue, Philadelphia, Pa., maker of electrical measuring instruments, has issued bulletin No. 228 illustrating and describing the company's high sensitivity galvanometer.

The Kellogg Switchboard & Supply Co. has recently closed a contract with the Independent Construction Co., of Los Angeles, Cal., for a 250-line magneto switchboard, and 100 standard four-party magneto wall sets. This equipment is to be installed at Downey, Cal. The switchboard, the woodwork of which is of quarter-sawed oak, is equipped with 75 lines with an ultimate of 250 lines and has four-party selective ringing. The telephone sets are all provided with four-bar generators and 1,600-ohm, biased, ringers.

Legal Cases and Decisions

By A. H. McMillan

Duty to Furnish Current.

"We made a contract with a light and power company by which it agreed to buy the meter now in use in our office for $10, said amount to be paid us in electric current used in our central office. The company further agreed to furnish electric current sufficient to run the present equipment in our office, at a flat rate of $1 per month, payable at the expiration of each month. It was agreed, in case we were compelled to install a meter, that the electric company would furnish us for $10, with the same grade of meter as the one now in use by us.

"There is still due us in current, to pay for the meter, $6 or $7. What we wish to know is whether we can force this company to furnish us current for a long enough time to pay for the meter. It has closed the plant, claiming it does not pay to run it. Can we, under this agreement, force the company to furnish us current for the balance of the time its franchise is to run, which is about 18 years? Could we collect damages from the company on account of its failure to run and furnish us with current? We use the current in operating our switchboard and for lighting."

An electric light and power company occupies a dual relation—a public relation to the people and a private one to its stockholders. In its public relation, it is its duty to operate its plant according to the terms of the ordinance or statue which confers is franchise upon it. This duty transcends all duty to its stockholders and in a proper case, the performance of it may be compelled by mandamus. This duty does not, however, require it to operate at a financial loss. It is therefore a question of fact whether the company can or cannot run except at a loss. If it can run without such loss, you have the right to compel it to furnish current. If it does not do so, you have the right to collect damages from it on account of the failure to perform its contract.

License Taxes.

Under an ordinance imposing a license tax on the conduct of a telephone business, an agent of a company, without any interest in it, or any control of its business, aside from acting as its agent, was not "conducting a telephone business" and was not required to have a license, and hence even if the company had forfeited its license by failure to furnish a free city telephone in consideration of which the license was given, it was not subject to a fine for violation of the ordinance. So held the Supreme Court of Missouri in a prosecution brought by the city of Carterville against Della Gibson, the agent of the telephone company in the city. She was arrested for conducting a telephone business in the city without a license and fined, but appealed her case.

The court further held that in the absence of some specific law to the contrary, no agent conducting a business is personally responsible for the acts of the principal, unless the business is of itself unlawful, such as gambling, selling liquor, or carrying on some public nuisance which a license legalizes, and which, until the principal has been legally authorized, neither he nor his agent may lawfully carry on. Carterville vs. Gibson, 168 Southwestern, 673.

Crediting Subscriber.

Where a telephone company through mistake, failed to credit a subscriber with a payment, or to correct such mistake after it was called to its attention and discontinued service, its refusal to restore the service for eleven days after the subscriber had conclusively shown that the discontinuance was unwarranted, was an act of bad faith whether it resulted from spite or reckless obstinacy. So held the supreme court of New York in a case brought against the New York Telephone Co. to recover the amount of a statutory penalty.

The transportation corporations law (Section 103) requiring a telephone company to receive dispatches from and for any individual and to transmit them with impartiality and in good faith under a penalty, prohibits the discontinuance in bad faith of a subscriber's telephone service, since the statute, although to be construed strictly as a penal statute, must be so construed as to have some meaning as a literal reading of the word "dispatch" makes the section meaningless. Judge Guy dissented from the decision on the ground that there was grave doubt whether the statute was not limited in its application, so far as telephone companies are concerned, to the receipt and transmission of messages at public offices or pay stations, established for the transaction of business by the general public. Rose vs. New York Telephone Co., 147 New York State, 1021.

Avoiding Contract.

In affirming a judgment got by the administratrix of a deceased person against the Sleepy Eye Telephone Co. for wrongfully causing his death, by not preventing a contact between the telephone wires and those of the city electric light plant, the court held that there was negligence. In so doing it mentioned several methods of avoiding contact, speaking as follows:

"If the messenger wire came into contact with the city electric wires, there was danger of injury. Such contact was easy of avoidance. Several methods of avoidance were suggested. A rope might have been strung from pole to pole above the electric wire. A netting might have been used. The electric wire could have been bridged. A rope could have been strung from telephone pole to telephone pole, and looped, and the messenger wire passed through the loops. There were perhaps other methods which would have secured safety. None of the methods suggested involved an appreciable expenditure of time or money." Hutchins vs. Sleepy Eye Telephone Co., 147 Northwestern, 279.

Use of Rest Room.

A long distance telephone operator was injured by the fall of a locker in the rest room provided for the company's employes. During certain periods of the day the operators were required to rest and to do so in the rest room. There was a balcony in the room on which stood a row of lockers where the operators put their wraps. Alterations were being made in the building, including the removal of the balcony in the rest room. Some workmen were removing the doors of the lockers preparatory to removing them from the balcony. One of the lockers, which were of steel, fell, striking the operator in question on the head and injuring her. She recovered a judgment against the company which was reversed by the Kansas City Court of Appeals. The court held that the company was under obligation to see that the rest room was maintained in an ordinarily safe condition. The court reversed the judgment on the ground that there was not sufficient evidence to sustain a finding that negligent construction was the cause of the accident. Mullerty vs. Missouri & Kansas Telephone Co., 168 Southwestern, 213.

Indecent Language Over the Telephone.

Suit was brought against a telephone company and one of its employes for interruption of service. It was alleged that the plaintiff paid the company its toll of 50 cents for three minutes' long distance conversation over its wires to another person, who was also a plaintiff. That by the agreement this 50 cents was to cover the three minutes interrupted use of the wire to talk. It was further alleged that the company and the individual jointly made indecent and insulting remarks to the plaintiff and thus broke off their conversation, preventing their continuing it, to their damage $50,000. The court held that the cause of action against the company and against the employe were entirely separate and distinct, and that separate suits should have been brought. Murray vs. Southern Bell Telephone & Telegraph Co., 210 Federal, 925.

Furnishing Lunch Rooms for Operators.

A telephone operator in the employ of the New England Telephone & Telegraph Co. was injured by the collapse of a chair while in the act of seating herself at a table in a lunch room which the company provided for the purpose of furnishing lunches to its employes, as part of their compensation. A verdict for the plaintiff was sustained on the ground that the company was bound to exercise reasonable care to maintain the lunch room chairs in a suitable condition for use. Callahan vs. New England Telephone & Telegraph Co., 103 Northeastern, 922.

Reading Trade Papers

By WALT MASON

I asked Jim Quackenbush a question—telephones and such are sure his line—: "Say! Don't you have the indigestion? You read trade papers all the time."

Old Jim laid down his weekly paper and wound his whiskers round his neck, and said: "It is the proper caper to read up on your trade, by heck! The lawyer, if he'd make a killing, must read his law books, day by day; the clergyman, however willing, without research can't make it pay; the doctor, if he'd be a winner, must read the books by experts made; and so it is with wheelwright, tinner, and every man who has a trade. If this is true of lawyer, healer, that each must cultivate his mind, it's just as true of every dealer—none can afford to go it blind.

"This journal here, in every number, contains some fact, or hint, or phrase, to guide the man who deals in telephone, and help him forty-seven ways. And so it is with Griggs, the superintendent; he takes trade papers three or four. They bring his world of commerce closer, and help his business all the more. Now there's the other fellow, Harkness. For printed stuff, he spends no dimes. He gropes along in doubt and darkness, a hundred years behind the times.

"Oh, these be times of stress and hustle, and giants wrestle for the tin, and man —so help me Lillian Russell—must know his business, if he'd win. That's why I take this useful paper, and through its helpful columns wade; and every exchange manager and draper, should take the one that fits his trade. Now, run along and leave me, sonny. I have to earn my daily bread, and while I'm taking in the money, you might sit down and soak your head."

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Condensed News Reports

Officers of Companies are Earnestly Requested to Forward Us Promptly All Financial and Other Statements as Soon as Issued and Any Items of Interest as to Their Plants and Systems

Personal.

W. E. BELL, who has been local manager for the Lincoln Telephone & Telegraph Co. of Lincoln, Neb., for several years, has been made district manager of this company.

L. J. MCMASTERS, has succeeded H. F. Hill, as manager of the Central Union Telephone Co. of Indianapolis, Ind. Mr. McMasters has been plant chief of the local plant for several years. He will retain this title in addition to the new one.

D. L. SPANGLER has resigned as manager of the Bryan Telephone Co., of Bryan, Ohio, and will enter the firm of the Spangler Manufacturing Co. Mr. Spangler has been with the Bryan Telephone Co. for ten years, and prior to that he was connected with the Williams County Toll Line Co. The Bryan Telephone Co. has not yet selected a successor to Mr. Spangler.

CHARLES A. ROLFE, vice-president of the Southwestern Home Telephone Co., at Redlands, Calif., called at TELEPHONY's office this week on his way to Mt. Clemens, Mich. Mr. Rolfe, who is well known among Independent telephone men all over this country, reported satisfactory conditions in his section of the Golden State. His company operates 2,750 telephones and is practically without competition in Redlands and vicinity.

G. W. ROBINSON, president of the Tri-State Telephone & Telegraph Co., St. Paul, Minn., was a caller at TELEPHONY's office this week, and reported flourishing conditions in the territory served by his company. The Tri-State is carrying out its 1914 plans for extensions and is experiencing a healthy increase in toll business, amounting to about 14 per cent. over last year. Work on the Wisconsin line from St. Paul to Superior is progressing satisfactorily, and President Robinson says that the Northwest has felt no ill effects from the European war or business depression in the United States. "As in 1907, we are finding out that so-called hard times have little or no effect on the telephone business," said he. "People must use the telephone in any event and in fact, when commercial houses lay off traveling men for economical reasons, they invariably do more business by telephone. The Tri-State certainly has no complaint of conditions.

New Companies.

PLYMOUTH, ILL.—The Buncombe Metallic Telephone Co. has been incorporated with $800 capital stock. The incorporators are R. A. Scott, F. E. Hendrickson, F. A. Scott, C. F. Hendrickson and David Holton.

BIDDEL, KY.—The Biddel Telephone Co. has filed articles of incorporation. The incorporators are R. G. James, S. M. Penn, J. H. Warring and T. J. Penn and the capital stock is $400.

SEITZ, KY.—The Maxine Telephone Co. has been incorporated with $480. The incorporators are: Eli Williams, J. H. Walters, Marlin Bach and Harry Back.

MIDDLEFIELD, OHIO.—Articles of incorporation have been granted the Middlefield Telephone Co. which will operate in this city. The capital stock is $10,600. The incorporators are W. A. Boorne, J. N. Johnson, and F. N. Griffin.

E PLURIBUS UNUM

Translated Into Plain Business English Means

ONE FROM MANY

Here is part of a letter received from one of the many satisfied users of Ericsson telephones. The whole letter and name will be given to any interested party on request.

"From the date of my purchasing this instrument to the present time, which as I remember it is about 10 years, I have not had a single cent of expense on same and I do not think the instrument is now in need of repairs but the connection cords are somewhat worn and I wish you to look over the instrument and see that it is all O. K."

A mighty fine recommendation but we have lots more of the same kind.

Put yourself into the same class by trying one of these handy mike desk stands—the telephone referred to in the above letter.

ERICSSON MFG. COMPANY

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Butte, Mont., 53 East Broadway.
Cedar Rapids, Iowa, 215 So. Second St.
Chicago, Ill., 14 N. Franklin St.
Cleveland, O., 124 St. Clair Ave., N. E.
Edmonton, Alta., Can., 504 Agency Bldg.
Havana, Cuba, P. O. Box 6.
Indianapolis, Ind., 124 So. Meridian St.
Jacksonville, Fla., 24 W. Forsythe St.
Lincoln, Neb., 136 So. 10th St.
Los Angeles, Cal., 1233 So. Olive St.
Louisville, Ky., 514 W. Main St.
Minneapolis, Minn., 19 N. 6th St.
New Orleans, La., 810 Canal St.
Pittsburgh, Pa., 31 Terminal Bldg.
Portland, Ore., 329 Ankeny Ave.
Richmond, Va., 5 Governor St.
San Francisco, Cal., 530 Golden Gate Ave.
Spokane, Wash., Paulsen Bldg.
Toronto, Canada, 36 Adelaide St.

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If you are interested in High Grade Common Battery Telephones or Switchboards, drop us a line.

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WILKINSON, S. D.—The Wilkinson Farmers' Mutual Telephone Co. has filed articles of incorporation by A. R. Young, C. Morris and J. C. Conkley. The capital stock is $1,000.

AKON, WIS.—Articles of incorporation have been filed by the Knapps Creek Mutual Telephone Co. The incorporators are: Frank Brady, Fred Tiller, Hugh Devine, Stephen L. Welch, M. Murphy, K. E. Gorman and Thomas Kinney, all of Akon, Wis.

GLEASON, WIS.—The Gleason Telephone Co. has filed articles of incorporation, the capital stock being $5,000. The following are the incorporators: Robert H. Smith, S. G. Meany and W. P. Levia, all of Gleason, Wis.

Construction.

BIRMINGHAM, ALA.—The Southern Bell Telephone & Telegraph Co. will spend $24,000 to install additional trunks between the four exchanges in Birmingham.

SAN DIEGO, CAL.—The Pacific Telephone & Telegraph Co. has authorized the expenditure of $72,000 in extending and improving the San Diego service. Of this amount, $37,000 will be spent in additional work on the Hill Crest exchange, the building for which was completed last year. The company will also spend $21,000 on cable circuits to Point Loma.

HUNTINGBURG, IND.—The Dubois County Telephone Co. which recently took over the plant of the Cumberland Telephone & Telegraph Co. in this place, is making extensive improvements. The entire plant at Birdseye is to be rebuilt, and improvements will also be made at Celestine.

KALAMAZOO, MICH.—The Michigan State Telephone Co. has appropriated $50,000 for improvements to its local system. Work is to be started at once.

BRISTOL, TENN.—A metallic circuit is now being constructed that will connect Bristol with Big Creek. The poles of the electric company will be used.

Financial.

ALLENDALE, MICH.—The Allendale Telephone Co. has increased its capital stock from $4,000 to $8,000.

BUTLER, PA.—The financial report of the Peoples' Telephone Co. shows a net increase of 15 per cent. in receipts over the previous year. The disbursements on account of dividends amounted to $14,000, and $6,000 was added to the surplus after all expenses for maintenance and improvements had been paid. The dividends for the year amounted to 6 per cent. on the capital stock.

Elections.

BUTLER, PA.—The Peoples' Telephone Co. held its annual meeting recently at which time the following officers and directors were elected: Daniel Younkins, president; T. J. Sheffin, treasurer and general manager; T. M. Baker, secretary; and J. E. Forsythe, superintendent. Directors: H. W. F. Graham, T. J. Shuffin, J. Henry Troutman, Daniel Younkins and T. M. Baker.

Franchises.

SAN FERNANDO, CAL.—The city council has granted permission to the Consolidated Securities Co. to transfer its telephone franchise to the San Fernando Telephone & Telegraph Co.

RIVERSIDE, CAL.—Bids will be received up to September 21 by the board of supervisors of Riverside county, for a franchise to maintain a telephone and telegraph system in the town of Blythe, application for which was made by Floyd Brown.

OREGON CITY, ORE.—The county court has granted a franchise to the Home Telephone & Telegraph Co. to construct a line to Lake Shore Villas on Oswego Lake.

COLFAX, WASH.—The board of county commissioners is considering the application of H. G. Kirkpatrick, of Tekoa, for a telephone franchise for a line from Tekoa, Wash., to Plummer and De Smet Misson, Idaho.

TEKOA, WASH.—H. G. Kirkpatrick has applied to the board of county commissioners for a franchise to construct a telephone line from Tekoa to the state and county line east of town.

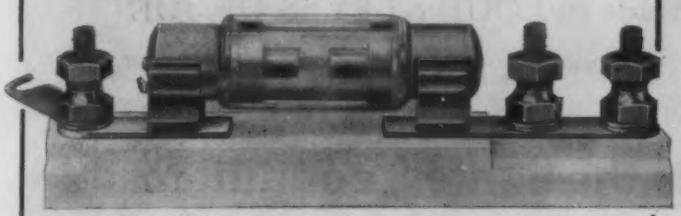
Miscellaneous.

LEBANON, NEB.—The Beaver Valley Telephone Co. has purchased the Walter Devoe building and will remodel it for use for exchange purposes.

TRENTON, N. J.—Vice-Chancellor Backes has appointed G. F. Wright, of Paterson, receiver for the Paterson, Passaic & Suburban Telephone Co. The receiver was applied for by James Kerney, receiver of the Interstate Telephone & Telegraph Co., of New Jersey, which is a creditor for $40,000. The bond of Mr. Wright was fixed at $25,000.

BRACH ARRESTERS

have been victorious wherever put in service. They have overcome the forces of nature by keeping telephone lines clear of trouble. Our customers have written us, stating that they are well satisfied with the instruments, and the instruments have done all that we claim for them. Why not let Brach Arresters do the same for you? Our prices are lower than they ever have been, owing to improved facilities, without sacrificing the quality of our products.



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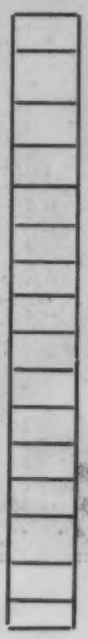

Cracraft-Leich type A 2-bar 80 ohm series compacts..... $5.00
Kellogg No. 2654 type 3-bar 80 ohm series hotel sets, $3.65; with hinged transmitter 3.90
Stromberg-Carlson No. 104 type 4-bar 1,600 ohm bridging compacts..... 6.50
Cracraft-Leich type A 4-bar 1,000 ohm bridging compacts 6.25
Cracraft-Leich type A 4-bar 1,600 ohm bridging compacts..... 6.50
Dean Elec. Co. No. 240 type 4-bar 1,000 ohm bridging compacts..... 6.00
Dean Elec. Co. No. 240 type 4-bar 1,600 ohm bridging compacts..... 6.25
Kellogg No. 30 type straight line common battery wall sets..... 4.00
Dean No. 70 type straight line common battery wall sets..... 3.50
Monarch straight line common battery wall sets 3.50
Monarch 3-bar 1,000 ohm bridging hotel set, $3.75; with hinged transmitter..... 4.00
Stromberg-Carlson No. 257 type straight line common battery steel hotel set..... 4.00
Cracraft-Leich straight line common battery oak hotel set..... 3.50
Kellogg No. 186 type straight line common battery oak hotel set..... 3.75
⅜ x ⅝ copper test connectors, per 100.... 2.00
Western Elec Co. No. 46 5-bar bridging hand generators, NEW..... 2.25
No. 4 glass knobs, per 100, 70c; by the 1,000 6.00

For complete list of standard apparatus refer to our REBUILT BARGAIN BULLETINS (free on request). Stock received since bulletin was published shown in our TELEPHONY ads.

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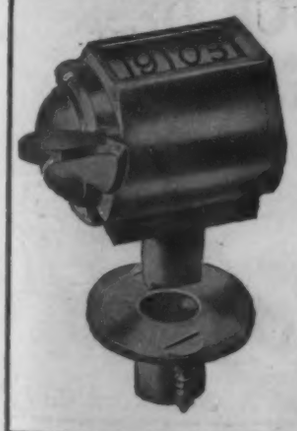
The L & N Type S Portable Testing Set
Accurate—Rugged—Inexpensive

At no sacrifice of quality or accuracy we are now producing an inexpensive Dial Decade Testing Set. The low price of this set is made possible because of a design which has been carefully worked out to admit of advantageous manufacture of parts in quantities. Further, the design is such that assembling is easily and quickly done. Accuracy and the usual Leeds & Northrup reliability have beenretained. Our guarantee is behind every set.

Price $60

Let us Send you Bulletin No. 530. It describes the set in detail.

The Leeds and Northrup Co. 4901 Stenton Ave., Philadelphia, Pa.



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¶ When you desire to take the count of the calls the operator answers, a Veeder Counter is necessary.

¶ Get a counter that can be depended upon at all times. You can make no mistake in selecting the Veeder.

¶ Write for catalogue which gives a complete description.

THE VEEDER MFG. CO.
11 Sargeant St. Hartford, Conn.

Makers of Cyclometers, Odometers, Tachometers, Tachodometers, Counters and Fine Castings.

Chapman Lightning Arresters

Are trained to the minute and ready for the opening of the season

HOW MANY CAN YOU USE?

Minnesota Electric Co., Minneapolis, Minn.

Carrying 30 feet 3-inch socket joint conduit.

Orangeburg Fibre Conduit

("Admitted to be the best Fibre Conduit")

Made in FOUR STYLES OF JOINTS

Socket, Sleeve, Screw and Harrington

WITH BENDS AND FITTINGS FOR SAME

Is the lightest conduit made

and means low freight and cartage costs

Send for The Conduit Book

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S. B. Condit, Jr., & Co., Boston, Mass.
Bryant Zinc Co., Chicago, Ill.

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Orangeburg, New York
McClary-Jemison Machinery Co., Birmingham, Ala.
Tri-Provincial Electrical Supply Co., Winnepeg, Can.

Pierson, Roeding & Co., San Francisco, Cal.
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Seattle, Wash.
Salt Lake City, Utah.

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Utility Commission Representation a Specialty
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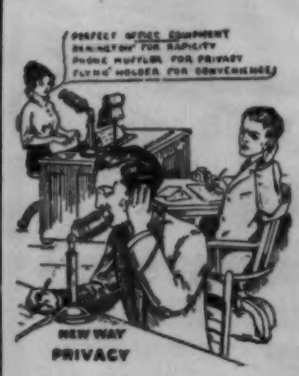
CHICAGO Harris Trust Co. ENGINEERS BOSTON 248 Boylston St.
Plans, Specifications, Supervision of Construction
General Superintendence and Management
Examinations and Reports
Financial Investigations and Rate Adjustments

EDWARD E. CLEMENT
ATTORNEY AT LAW
Practice includes representation before the Interstate Commerce Commission
SOLICITOR OF PATENTS
OFFICE: McLACHLEN BUILDING, WASHINGTON, D. C.



A PRIVATE BOOTH ON YOUR DESK

You can insure absolute privacy and secrecy with
Scher's Improved Telephone Muffler

You need not leave your desk to go to a private booth to talk freely, and confidentially over the phone. This invention gives the equivalence of a telephone booth.

It is instantly attached and detached on the telephone transmitter. No complicated parts. Occupies 3½ inches of space on the mouthpiece of phone and is at your elbow when in need.

It is unquestionably the most useful telephone accessary of today. Made of Aluminum. Lasts a lifetime.

Used by U. S. Dept. of Agriculture, First National Bank, Guarantee Trust Co. and thousands of others over the world.

If dealers' can't supply you, we will forward one prepaid on receipt of $3.50.

AGENTS wanted in U. S. and Foreign Countries. Write for Territory.

Amalgamated Sales Corp., Mfr's., 1478 Broadway, Dept. A, New York City

Please tell the Advertiser you saw his Announcement in TELEPHONY.

"Opportunities"

Copy for classified advertising for the current issue should reach us not later than Thursday morning when forms close. Rates for classified advertising will be sent upon request.

"Rebuilt" Telephone Apparatus

and exchange equipment saves you 30 to 50 per cent without sacrificing quality or efficiency.

Switchboards

—Telephones—Apparatus—Protection Equipment—Cable—Everything you need for the installation and operation of a complete exchange—Magneto or Central Energy—of the best and most reputable manufacturers.

Seven Years Successful Operation

of our "Rebuilt" Equipment Department puts it past the experimental stage. Quality and price will make you a permanent customer. Better investigate.

Ask for Our Free No. 78 Bargain Bulletin. Address
"Rebuilt" Equipment Department
PREMIER ELECTRIC COMPANY Chicago, Ill.
"REBUILT" when connected with PREMIER means something

Telephone Bookkeeping

USE OUR SIMPLIFIED SYSTEM and "Printco" books and forms and save money, time and worry. Free samples and price list. Telephone Printing Co., Defiance, Ohio.

Cable Testers

A CABLE TESTER to be a success must work thru high resistance Moisture faults as well as dead shorts, crosses or grounds. Get a Wireless Cable Tester on trial and compare it with any other. Electric Specialty Mfg. Co., Cedar Rapids, Iowa.

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TELEPHONE COMPANIES—We make yellow pine cross arms, pins, steps and brackets. Prices and quality right. Prompt shipment. Write us. Central Lumber Co., Chattanooga, Tenn.

Directory Hangers

WE BEG TO DIRECT YOUR ATTENTION to the Universal Wire Loop, an improvement upon the ordinary string loop for hanging up catalogues, directories, telephone books, prices current, etc. Write us for prices and samples. Wire Loop Mfg. Co., 75 Shelby St., Detroit, Mich.

Equipment For Sale

FOR SALE CHEAP—Having installed central energy, we offer for sale at about one-third the original cost, about 1,000 compact style bridging telephones that are practically as good as new; also a few hundred series telephones of same style. Send for descriptive circular. Richard Valentine, Gen. Mgr. Rock County Telephone Co., Janesville, Wis.

Expert Services

I AM A PATENT EXPERT. Consulting Engineer and Specialist in Electrical and Telephone Engineering. What is your problem? Francis W. Dunbar, Monadnock Block, Chicago, Ill.

Help Wanted

WANTED—Lady manager and assistant for exchange of 250 telephones, good pay, nice location and all equipment and methods modern. Address The United Telephone Co., Monroe, Wis.

Plant For Sale

FOR SALE—Telephone exchange in small town in northern Missouri. Must be sold. Reason—Owner's loss of hearing. Address 1884, care TELEPHONY.

Plant Wanted

WANTED—A 120-line lamp switchboard, also 120 portable desk and wall telephones. Stromberg-Carlson, or Dean Electric Co. make. Address L. J. Loeffler, 20 Fulton St., New York, N. Y.

WANTED—To exchange an improved 320 acre farm in Oklahoma, but four miles from railroad town; with house and barn; soil is adapted to wheat, corn, cotton, sweet clover, blue stem and alfalfa grass. Valued at $8,000; for a telephone exchange worth from 6,000 to $9,000. For full particulars, address "Owner," Lock Box 244, Kiowa, Kansas.

Poles

CHESTNUT POLES—We specialize in 6 and 7-inch top chestnut poles, 25 to 50 feet long. Also Long Leaf Yellow Pine Cross Arms. John A. Cranston Lumber Co., 109 King St., Wilmington, Dela.

POLES—Always complete stock on hand. We can save you money. Write today for delivered prices. Prompt shipment. E. C. Wetherby & Co., Warroad, Minn.

Positions Wanted

WANTED—Position as telephone manager with some good company. Ten years' experience. Am money maker. Address W. L. Pfleger, Marked Tree, Ark.

WANTED—Position as engineer or as engineering salesman by young man with six years' experience on telephone cable, pole line, and central office equipment plans, specifications and estimates, development plans, inspection of installation of central office equipment and of material, also on electrical contracting. Technical graduate. References. Address 1888, care TELEPHONY.

WANTED—Permanent position as an all around telephone man in some small city exchange, understand testing cable. Maintenance, outside and inside construction. Local or common battery. Can furnish references. Address 3333, care TELEPHONY.

WANTED—By telephone man now employed who desires connection with some good independent company either as superintendent or in engineering department. Twelve years' experience, married. Address 1895, care TELEPHONY.

Ribbons for Calculagraph

A 50 PER CENT. SAVING interests you. Our price, 25c each —$2.50 per dozen. Customers say, "Best ribbons they have ever used." Horney & Wright, La Fayette, Ind.

Telephone Plant Construction

WHEN YOU BUILD A NEW EXCHANGE or rebuild your old one, you will save money by consulting with us. Correspondence solicited. Home Electric Construction Co., Macomb, Ill.

Telephone Supplies

WE ARE JOBBERS. Get our prices on telephones, wires, pins, brackets, poles, cross arms, glass insulators—pole line hardware. Indianapolis Elec. Supply Co., Indianapolis, Ind.

CONSTRUCTION SUPPPLIES—Anything you need for your construction work can be ordered from us at prices that can't be beat. Doubleday-Hill Elec. Co., 721 Liberty Ave., Pittsburgh, Pa. Southern Warehouse, 727 12th St., N. W., Washington, D. C.

Test Connectors

WHY NOT GET THE BEST, as long as it costs no more? N. C. Test Connectors have exclusive advantages. Write if interested. Schutz Mfg. Co., 3225 Ravenswood Ave., Chicago.

Timing Devices

ACCURATE TOLL CALL RECORDS are of prime importance. Monarch Time Stamps provide records that cannot be questioned. Write for information. Walker Bros. & Haviland, Chicago, Philadelphia, New York.

Water Stills

WATER STILLS—Modern plant necessity; distilled water, best for batteries. Write for circulars. Sparta Mfg. Co., South Bend Ind.

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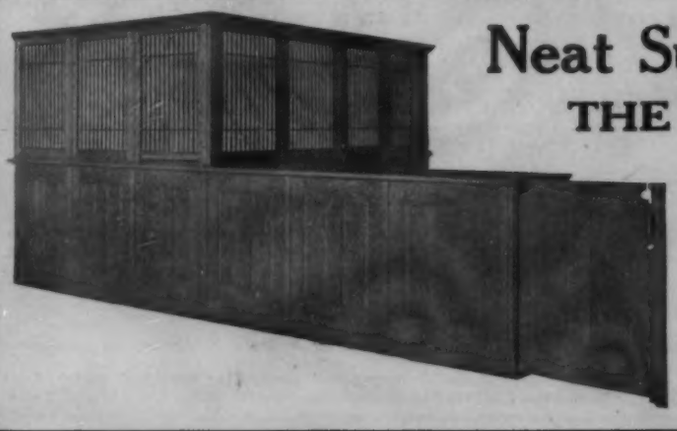

Neat Substantial Inexpensive

THE BROWNELL SYSTEM

of Interchangeable Unit Office Fixtures

Shipped knocked-down and assembled with a screwdriver.

All styles of telephone booths.

Send for Catalog

C. H. BROWNELL

PERU INDIANA

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Patented Nov. 15, 1904
No. 2521

IF YOU HAVE A FRANKEL TESTING CLIP IN "YOUR" KIT YOU ARE PREPARED TO LOCATE TROUBLE

You can make a "test" in one-tenth of the time required to skin a wire for one, and neither does the wire or insulation suffer any damage.

The point pierces the insulation and makes a perfect test. Can be used constantly, yet the point will never dull.

Prices:

No.	Less than 12	12 lots	100 lots	500 lots	1,000 lots
2521	20c	12½c	11c	10c	9c Ea.

Net F. O. B. New York, from your supply house.

Frankel Display Fixture Co.
733 Broadway New York City
or Western Electric Co., All Branches

The honest finish, construction and price of
RED DEVIL "BONDED" LINEMEN'S TOOLS
could not possibly mean anything but economy for you. Investigate.
SMITH & HEMENWAY CO., 140 Chambers St., New York, N. Y.

CEDAR POLES Write for Prices. Prompt Shipments from Wisconsin or Chicago Switching District Yard on I. H. Belt R. R.
TORREY CEDAR CO., Clintonville, Wis.

Two Groove Porcelain Knobs
are Ideal for Service Wires

Nos. 9 and 12 Pony Insulators

Double Petticoat Pony Insulators

Porcelain Insulation of All Kinds
Direct or from Your Jobber

Illinois Electric Porcelain Co.
Macomb, Illinois

LOST?

$696,967,261.00—

Before the first guns had thundered forth their message of European strife, America had begun to pay the penalty of fear and uncertainty. In one short week the quotations of 105 leading American securities had shrunk $696,967,261.00.

But it was not a shrinkage of American making. It was a result of the desire of European security holders to trade their securities for cash. Cash is a handy thing in war times.

War means ordinarily peaceful merchants shooting guns at normally peaceful farm hands; factory operatives busily engaged in sabering machinists; baker boys galloping madly about on horses which ought to be hauling bread.

Business and War have nothing in common. When war stalks abroad, Business goes elsewhere, and Money is the boon companion of business.

When Europe sold back to us millions of dollars of securities it was in an effort to obtain money with which to later purchase from us some of the things Europe must have. Europe is an old customer of ours, but she is expecting to buy now more largely than ever before, and her $300,000,000 income from globe-trotting Americans will probably be missing this coming year.

Meanwhile, Europe has been compelled to shut up her own shop. There are new faces looking at us across our counters and fingering our goods. Europe used to number them among her customers.

Let's straighten up the counters and dust off the shelves. It looks as if business was going to be brisk and we might as well be ready. And if it is necessary to hire extra help to look after trade, we'd better start looking around for it now.

A CONFIDENCE Ad
By F. K. Anderson
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The Furniture Journal, Chicago

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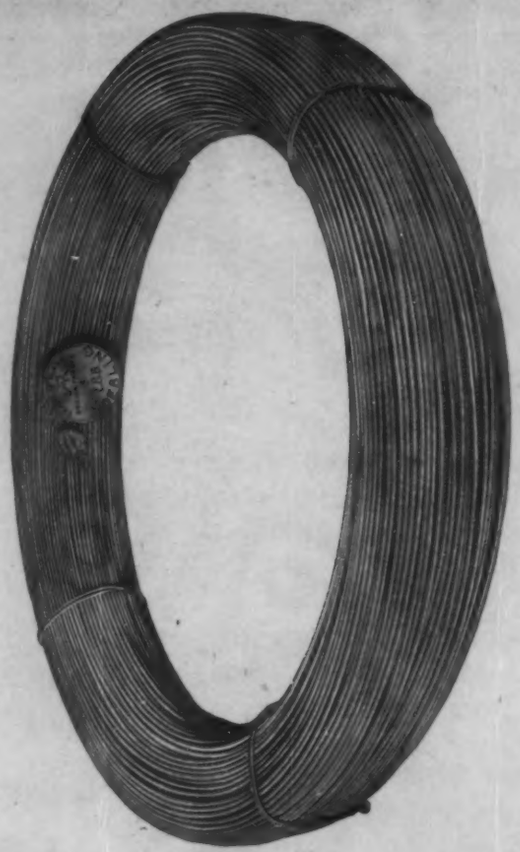

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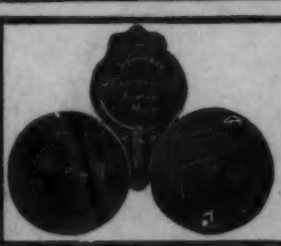

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